DOCUMENT RESUME

ED 050 061 SP 007 108

AUTHOR	Starr, John W., 3rd., Ed.
TITLE	Resource Handbook--Animals. A Supplement to Basic Curriculum Guide--Science, Grades K-6.
INSTITUTION	Gary City Public School System, Ind.
PUB DATE	68
NOTE	151p.
EDRS PRICE	EDRS Price MF-$0.65 HC-$6.58
DESCRIPTORS	*Animal Behavior, *Curriculum Guides, *Elementary School Curriculum, *Elementary School Science, Grade 1, Grade 2, Grade 3, Grade 4, Grade 5, Grade 6, Kindergarten, *Science Education

ABSTRACT

GRADES OR AGES: Grades K-6. SUBJECT MATTER: Science; animals. ORGANIZATION AND PHYSICAL APPEARANCE: The guide is divided into the following sections: initiary activities; developmental activities, evaluation, vocabulary, children's books, and films. OBJECTIVES AND ACTIVITIES: Fifty-one concepts are included in the section on developmental activities. Details of activities are given for each concept. INSTRUCTIONAL MATERIALS: Materials required are described in the various activities. The extensive bibliography and film list are annotated. STUDENT ASSESSMENT: Samples of evaluation items are included to help the teacher develop an informal testing program. (MBM)

ED050061

RESOURCE HANDBOOK - ANIMALS

(A supplement to Basic Curriculum Guide - Science)

Grades K-6

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SCHOOL CITY OF GARY
Gary, Indiana

1968

SP007108

PREFACE

The teaching of science in the elementary school is a responsibility of major significance. Through our efforts pupils should be helped to gain an understanding of science in the development of our culture. Likewise, we should emphasize the development of the ability to write and recognize social uses of science in daily life. In developing the ability to understand their natural environment, the pupils must also have a complete understanding of the process involved.

There is a need to improve teaching and learning in science continuously. New materials of instruction, new teaching approaches, and the continuing responsibility to meet the individual needs of students place great demands on all professional staff members to appraise the quality of teaching and learning in science. This publication represents an effort on the part of staff members within our school system to assist all staff members in improving the teaching and learning in science. It is hoped that all staff members who use this publication will find it to be of value.

Norman R Turchan

Norman R. Turchan
Director of Instruction

ACKNOWLEDGMENTS

I wish to express appreciation to the members of the Elementary Science Materials Committee for their extra effort in the preparation of this publication. The publication is a composite of materials which have been developed previously, combined with new material. Much of the material presented in this publication is the result of their intensive work and effort.

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Initiatory Activities

Have the children:

1. Listen to children's stories about the behavior of pets they now have, or have had in the past.

2. Read an interesting life-cycle story such as Buzztail by Robert McClung or Cottontail Rabbit by Elizabeth and Charles Schwartz.

3. Discuss man's dependence on animals and the importance of different types of animals to people in various parts of the world.

4. Make a list of the products used by them in one day that are provided by animals. Items such as food, clothing, feathers, fur, and leather are appropriate.

5. Tell stories about animals that man has developed by cross-breeding and selection. Some examples are the many kinds of dogs, horses, cattle, sheep, and chickens.

6. Make a chart listing a number of animals and each animal's chief adaptation for defending itself from enemies.

7. Make a collection of pictures of animals that show protective coloration or protective shape. Prepare a bulletin board display with appropriate captions for each picture.

8. Prepare a listing of names of some migratory birds that can been seen in in the community during certain times of the year. Provide columns to show the date the birds are first seen and the children who observed them.

9. Prepare a display of pictures showing various kinds of animals in their natural surroundings. Use captions to indicate one or more characteristic of each animal that adapts it to the surroundings shown.

10. Collect pictures of animals that belong to each of the animal phyla. Display the pictures so that animals in the same phylum are grouped together. Discuss some of the distinguishing characteristics of animals in each phylum, as shown by the pictures.

11. Prepare a frieze that shows at least one member of each of the major animal phyla from protozoa to vertebrates.

12. Make a list of some of the animals in the community that most people consider to be pests. Find out what is being done to control each of the pests listed. Find out whether there are any animal parasites that cause serious damage in the community.

13. Collect and display pictures of various animal homes.

14. Collect and display pictures that illustrate various animal adaptations that are of value in helping the animal protect itself from enemies.

15. Discuss how animals in the community adjust to seasonal changes. Make three lists of local animals showing those that remain active, those that hibernate and those that migrate.

Developmental Activities

CONCEPT: There are many kinds of animals.

1. Make a display of pictures and models of as many different kinds of animals as possible. Discuss the characteristics observed.

2. Display toy animals. Handle the toy animals and discuss their differences in structure and size.

3. Plan an animal cracker party. Identify and discuss the animals represented.

4. Dramatize familiar stories, such as:

   The Three Bears
   The Three Little Pigs
   Three Billy Goats Gruff

5. Construct clay models of animals. Use them to make table-top displays of circus, zoo, or museum scenes.

6. Compile a zoo picture book; compile a circus book.

7. Collect pictures and photographs of animals. Arrange a bulletin board.

CONCEPT: Animals move about in different ways.

1. Collect pictures of animals that are moving. Show that animals can move by running, galloping, swimming, walking, flying, crawling, jumping and hopping. If possible, get two pictures of the same animal--one walking and one running. Discuss differences in movement.

2. Observe the movements of fish in an aquarium. Note the movement of the tail and fins.

3. Observe the movements of a snail in an aquarium.

4. Dramatize with songs and rhythms the ways that animals move. Act out the slow, lumbering walk of the elephant or bear; the catlike grace of the tiger; the flapping wings of the bird; the hop of a kangaroo; the waddle of the duck.

CONCEPT: Animals need different kinds of food.

1. Make a display table of plant food used by animals (grass, carrots, acorns, lettuce, cherries, nuts). Match these to pictures or models of animals according to the plants which each animal eats; for example, horses eat grass, rabbits eat lettuce and carrots, squirrels eats acorns, some birds eat cherries.

2. Collect pictures of animals grazing, cats lapping milk, dogs eating meat, bees collecting nectar.

3. Make an experience chart of a trip to the dog show, stock show, circus, farm, or the aftermath of viewing an animal film.

CONCEPT: Some animals are pets.

1. Talk about their pets. Discuss such topics as:

    How I Got My Pet
    Why We Named My Pet the Way We Did
    Tricks My Pet Plays on Me

2. Bring in photographs of pets and make a bulletin board display. (Children without pets can draw or make cut-and-tear figures.)

3. Take a walk to a local pet shop. Be sure the children are prepared for the trip and have an organized list of questions for the pet shop owner. Follow the school procedure for field trips.

4. Make clay models of pets and display them as a pet show.

5. Read animal stories during story hour.

6. Listen to animal records.

CONCEPT: Pets need care.

1. Discuss the needs of pets. Plan a schedule of procedures that will care for the needs of a room pet. Consider such features as:

    fresh food and water
    clean home
    nest material
    provision for elimination and excretion needs.

2. Discuss ways pets can become a nuisance to neighbors through neglect by:

    destroying property
    jumping on people
    scattering litter around waste containers
    barking loudly.

CONCEPT: Some baby animals resemble their parents; some baby animals do not resemble their parents.

1. Display pictures of animals and their young that do resemble each other (humans, cats, dogs, horses, fish) and animals whose young do not resemble the adults (frogs, butterflies). Several days later separate the adult pictures from those of the young and have the pupil play a matching game with them.

2. Discuss ways in which human babies resemble their parents. Discuss the young of animal pets or other animals.

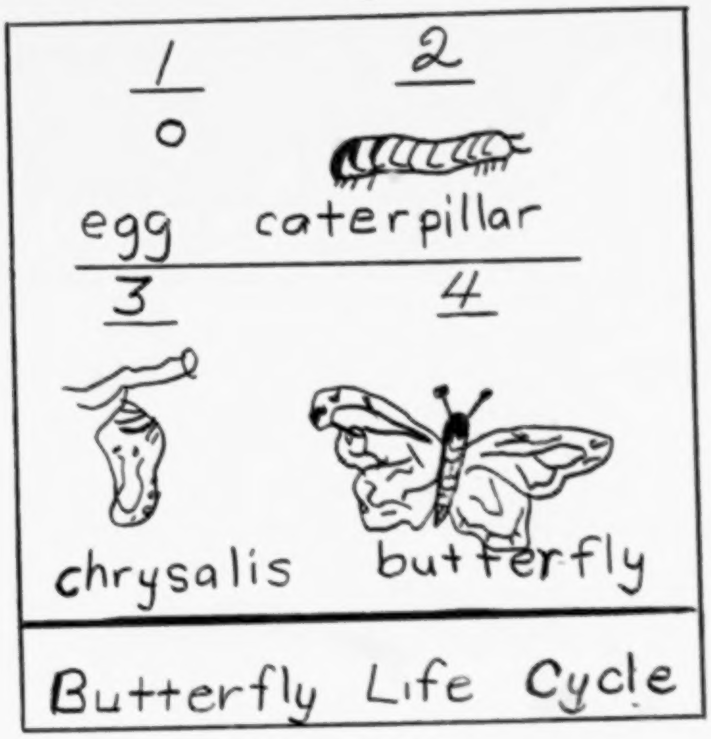
3. Place a caterpillar in a jar with a perforated cover. Add a twig and leaves from the same kind of plant on which the caterpillar was found. Keep the leaves moist. Observe the caterpillar.

   Show a film strip about caterpillars so that the children may follow the complete life cycle.

4. Bring in cocoons. Place them in an insect cage or in jars with perforated covers. Sprinkle the cocoons with water once a week to keep them from drying out. Observe often.

5. If possible, obtain a tadpole from a pond or pet store. Provide proper environment and have pupils keep a picture record of the bodily changes.

Animals and their Young



Butterfly Life Cycle

Fuzzy wuzzy, creepy crawly
  Caterpillar funny,
You will be a butterfly
  When the days are sunny.

Winging, flinging, dancing, springing
  Butterfly so yellow,
You were once a caterpillar,
  Wiggly, wiggly fellow.

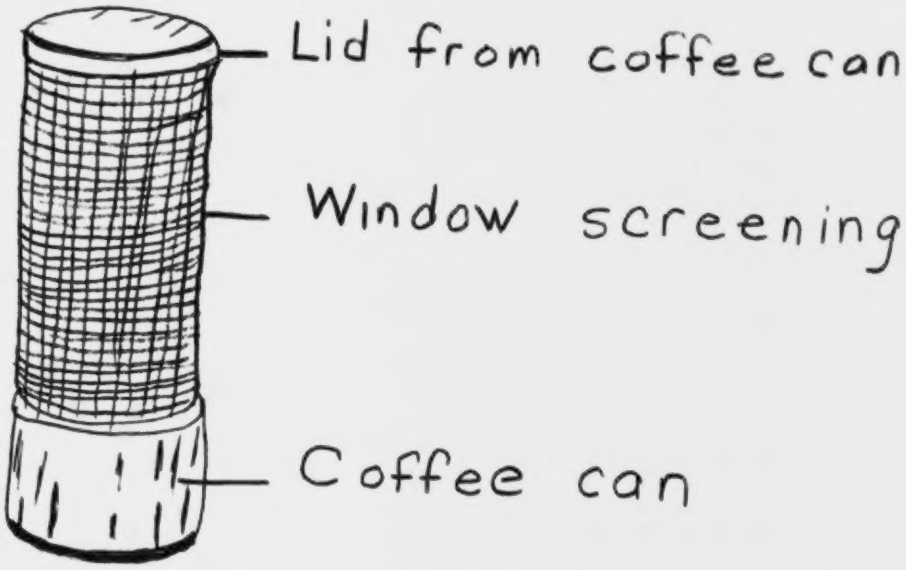
Lillian Schulz Vanada

6. Display a set of animal pictures. Divide the set into two subsets: one would include animals where the young resemble the adult and the other would include animals where the young do not resemble the adult. For example use the set:

   dog
   butterfly
   frog
   cat
   rabbit

7. Make a picture book of baby animals and their parents.

8. Construct an insect cage.



CONCEPT: Some baby animals need to have their parents take care of them. Some baby animals do not need to have their parents take care of them.

1. Discuss the way babies and children are cared for by their mothers and fathers.

   Why do parents care for their children?
   Do other animals take care of their young too?
   Are there some animals that do not?

2. Make a collection of pictures showing animals and their young: a cat and her kittens, a dog and her puppies, a horse and her colt, a duck and her ducklings, a bird and her nestlings.

   Display one or two pictures a day and make the highlights of a short discussion. Concentrate on:

      size of young and adult
      similarities of appearance
      evidence of parental care
      and background information the
        picture may afford concerning food.

3. Start a large Animal Album for the room. Add pictures as they are discussed. Place the album on the library table for children to review.

4. If a child's pet has young, appoint the child as class reporter. Have him report to the class on:

   number of babies
   color and size of babies
   way the mother cares for them
   way the mother moves them around
   action of babies.

5. Look in picture books in the room or in the school library to find pictures of animals with young.

6. Watch for patches of snail eggs on side of aquarium. Use a hand lens (reading glass) to watch babies develop and hatch with no help from mother. This illustration is a good example of abandoned eggs.

7. Bring in a turtle. Tell the story of the turtle's young.

8. Display toy animals in family groups.

9. Have pupils who have visited farms tell about young farm animals.

10. Make a mural of animals and their young.

Care of Young		
Much Care	Some Care	No Care
robin	duck	turtle
squirrel	sheep	grasshopper
skunk	chicken	butterfly
bee	porcupine	spider

CONCEPT: Different animals have different kinds of covering.

1. Discuss the coverings of:

   cats, dogs, bears, lions
   fish
   elephants
   turtles
   birds
   snails

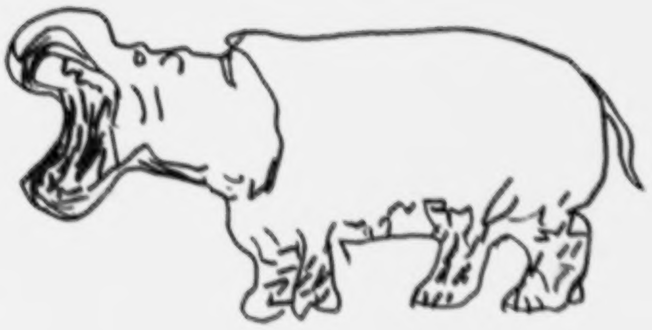
2. Discuss what we call our covering.

3. Bring in a small piece of fur, some feathers, some fish scales, possibly a turtle or clam shell. Attach them to a display board and have pupils place pictures of animals having similar covering.

4. Draw pictures and write simple stories about animals and their coverings.

5. Bring in pictures that show the uses man makes of animal coverings.

   Compare the size, shape, and covering of different mammals.



Drawings continued on following page.

CONCEPT: Different kinds of animals live in different places.

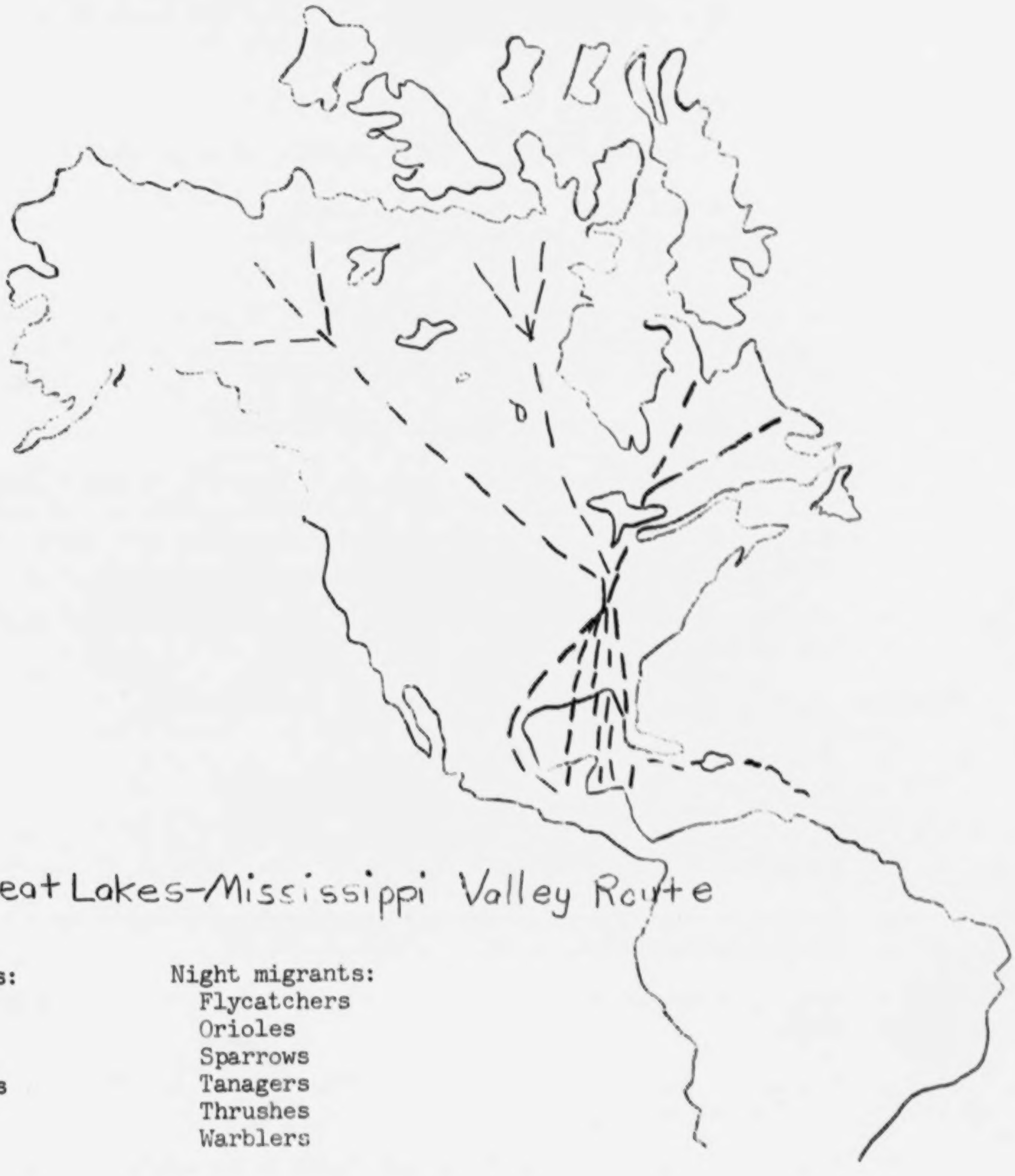
1. Discuss the different places in which animals find or build homes. Make a chart listing the places and the animals.
2. Recall the types of animal homes with which the children are familiar.
3. Write a classroom story of a trip. Draw pictures of the trip.
4. Utilizing bulletin board pictures of animals and their homes, use colored string to connect the animal with its home.
5. Using shelf paper and dowel rods, make a "movie" about animals.
6. Construct simple dioramas showing animals in their homes.

CONCEPT: The coverings of some animals change when the weather gets warm or cold.

1. Notice the furry coats of pets and observe that the fur becomes thicker as the cold weather approaches. Recall how animals shed their fur in the spring.
2. Display pictures of the snowshoe hare which is brown in summer and white in winter. Discuss.

CONCEPT: Some birds go south for the winter (migrate).

Bird Migration



Day migrants:	Night migrants:
Ducks	Flycatchers
Geese	Orioles
Hawks	Sparrows
Nighthawks	Tanagers
Swallows	Thrushes
	Warblers

1. Make a list of any birds seen in the school community during spring and summer.

2. If it is early in the fall and the children know the robin, appoint each child a bird watcher to observe the common sparrow and the robin. On a room calendar record every day that someone has seen a sparrow and a robin. Note that eventually the robins disappear.

3. Develop an understanding of the word migration.

4. Collect colored pictures of common birds. Display them in groups:

   a. those that stay in the city, on the farm, in the woods during the winter
   b. those that go away

5. Set up a feeding station outside a window or in a tree. In many communities, children may see only sparrows, but if another type of bird appears, help them to enjoy the thrill of this experience.

6. Make an experience chart on "Our Bird Visitors."

7. Simple map study may be introduced by indicating on simplified maps that most robins leave the Gary area to winter in the southern states and many hummingbirds fly across the Gulf of Mexico to winter in northern South America.

8. Display pictures of the monarch butterfly. Draw pictures showing the butterflies in flight.

CONCEPT: Some animals sleep during the winter (hibernate).

1. Introduce the word hibernate.

2. Show film or filmstrip on hibernation.

3. Collect pictures of animals asleep for the winter.

4. Develop a bulletin board showing several hibernating animals in their burrows, logs, caves.

5. Draw pictures of hibernating animals. Write a simple story about them.

6. Appoint a committee to act out an imaginary day in the woods. Call it "The Day Mr. Bear Went To Sleep for the Winter."

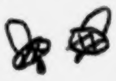
7. Learn more about the way toads and frogs go to sleep for the winter and tell the class.

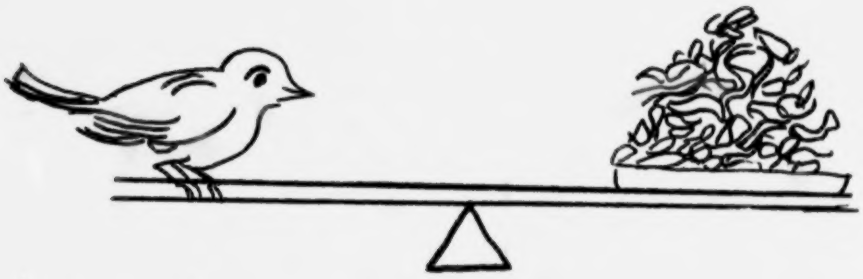
8. Find out what happens to the grasshoppers in the winter and tell the class.

9. Using a roll of shelf paper and dowel rods, make a "movie" showing an animal preparing to hibernate.

CONCEPT: Many animals store food.

Autumn

See the squirrel.
See the nuts. 
Squirrels eat nuts.
Squirrels save nuts
for winter.



The insects eaten in one day by a bird may balance the bird's weight.

1. Assemble a collection of pictures of squirrels and chipmunks gathering nuts. Display and discuss the pictures.

2. Bring in a honeycomb and have a "tasting party."

3. Make up stories about the following and tell them to the other children:

   The Bear Who Forgot to Go to Sleep
   The Busy Little Squirrel
   The Hard-Working Beaver

4. Draw pictures of the squirrel gathering nuts, the bear going to sleep.

CONCEPT: Animals that go south for winter return in spring.

1. Watch for the return of the birds, especially the "first robin."

2. Late in April or early in May, look for the monarch butterfly.

3. Try to locate bird nests which are being built or which have been built and are occupied. Observe nests daily until the babies leaves them.

CONCEPT: Animals that sleep during the winter wake up in the spring.

1. Have half of the children make a cutaway diagram of a pond and its bank, showing how frogs and turtles emerge from their hibernation in the mud at the bottom of the pond. On the bank, show a coiled-up hibernating snake drowsily awakening himself. Show a brilliant sun overhead. The other half of the class can report on the differences in hibernation for the following animals.

   Group A. woodchuck
   ground squirrel

   Group B. bear
   raccoon

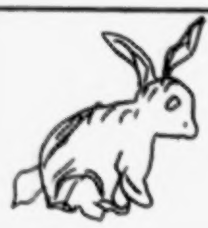
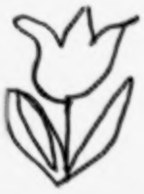
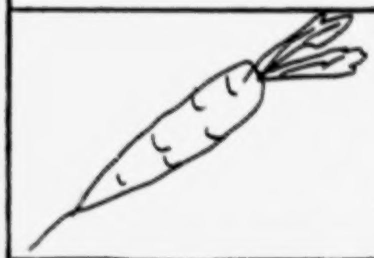
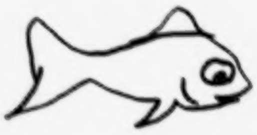
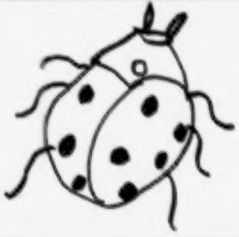
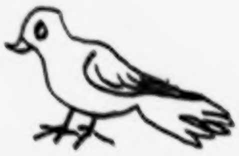
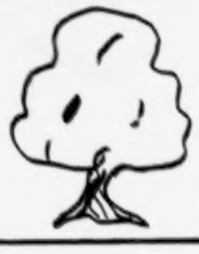
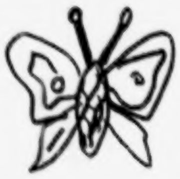
2. Make a mural of the awakened warm-blooded animals with appropriate spring flowers and insects in evidence.

3. Select some hibernating animal they would like to represent and write an original story or poem about the day that the animal emerges.

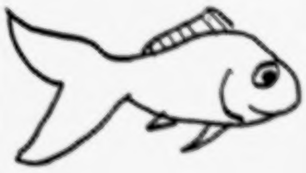
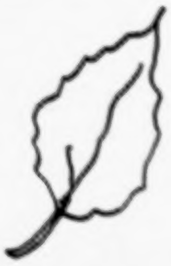
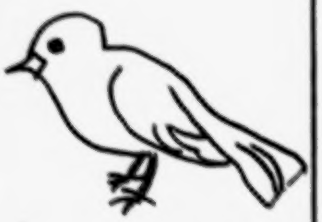
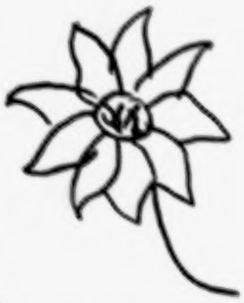
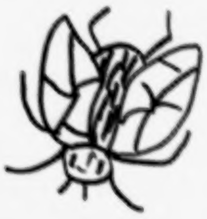
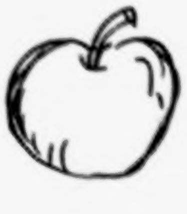
CONCEPT: All living things are either plants or animals.

1. Display an assortment of pictures of plants and animals. Have the pupils study and determine which pictures should be placed together. Place the titles of the two groups, as suggested by the class, on the bulletin board and have the pupils arrange the pictures under the correct title.

Is it a plant or animal?

	______
	______
	______
	______
	______
	______
	______
	______

Can you spell these words?

 f_ _ _	 l_ _ _
 b_ _ _	 f_ _ _ _ _
 i_ _ _ _ _	 a_ _ _ _

2. As pupils name the plants and animals, write the names on the chalkboard so they may be written into their science books.

3. Make a list of living things. Decide whether these are plant or animal.

CONCEPT: Every kind of animal is different in some way from every other kind of animal.

1. Bring in an earthworm, an insect, a fish. Make a list of ways in which these are different.

   How are they alike?

2. Put about five inches of soil in the bottom of a glass jar; add one-half inch of light sand. Sprinkle a little cornmeal over the sand. Put about five or six earthworms in the jar. Wrap the jar in black paper. Several days later remove the paper. Observe the passageways made in the sand by the worms.

3. Feel the earthworm.

   What kind of skin does it have?
   How does it move around?

4. Collect many different kinds of insects. Permit pupils to examine them with a magnifier. Note the shape of the body. Compare the number of legs found on each.

   How many legs do they all have?
   Do they all have wings?

5. Draw pictures of the insects and write a short story about them.

6. Bring a caterpillar or cocoon to class.

   What happens after a moth lays its eggs?
   How does the young animal take care of itself for the winter?

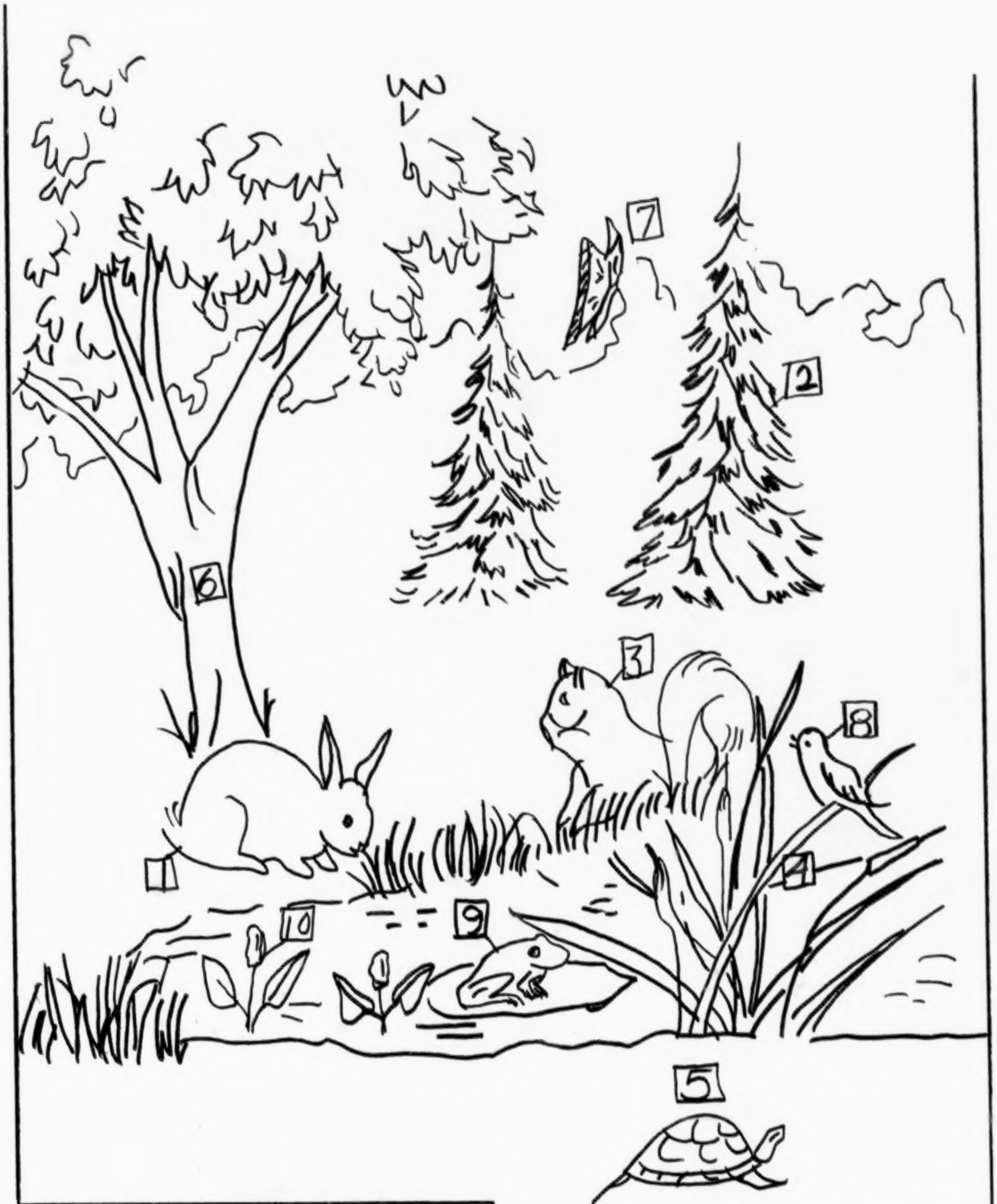
   Keep the cocoon until spring. Be sure it is in a cool, moist place to avoid drying out. Watch its emergence.

   When does the young look like its parent?

   Pupils should keep pictorial records of the changes. Compare the caterpillar with the earthworm.

7. Bring in a ladybird beetle (ladybug). Feel it. Find the wings. Look for its legs under a magnifying glass.

   How many are there?
   Are they all the same?



Put the numbers in the correct column:

Plants	Animals

8. Make a list of five to ten easy-to-know insects.

9. Put a spider in a square glass container along with strong dry twigs. Cover it securely. Watch the spider spin its web. Observe it under a magnifying glass.

10. From a display of pictures and some real insects have pupils select those they recognize.

11. Observe a fish in the aquarium. Watch the way it pushes water out from slits on the side of its head. Notice its tail, its fins.

    Does it have any arms or legs?
    Where must it live?
    How does its shape help it move?

12. Obtain some scales from a local fish store. Look at them under the magnifying glass.

    How do they serve the fish?

13. Recall previous learning regarding the way in which fish move through water.

14. Observe the bird in flight and on the ground.

    What does it use to fly?
    How many legs does it have?
    What covers its whole body?
    Can a bird live in water like a fish?

15. Make a list of common mammals:
    dog, cat, horse, bear.

    What type of outer covering do they all have?
    How do they move around?

16. Make a chart to summarize things learned about different kinds of animals.

Animal	Size	Skin or Covering	No. of feet	Wings	Claws	How it Moves
dog cat others	large	fur	four	no	yes	walks or runs
birds	small	feathers	two	yes	yes	flies, walks, or hops
fish	varies	scales	none	no	no	swims

17. Appoint one child or a committee of two to choose one of each kind of the animals discussed; find out all they can about its life and report to the class.

18. Appoint a committee of two or three to make a book for each of the different kinds of animals. Paste in or draw the colored pictures. Label. Call these "Our Book of Fishes," "Our Book of Birds."

19. Tape a large mural-size piece of paper across the board. Draw in a pond, show water's edge, land, trees, sky. Draw and cut out pictures of animals. Put them in the right place on the picture.

CONCEPT: Some animals are hatched from eggs.

1. Display pictures of birds. Discuss types of nests the children may have seen.

   Why do birds build nests?
   Why do many birds sit on the eggs.

   Describe any bird eggs they may have seen. Compare the size of a robin's egg with that of a chicken's egg. Compare the baby robin with the baby chicken.

2. Make a list of birds raised by man that are tame and the names of the baby birds:

   chicken--chick
   duck --duckling
   goose--gosling
   turkey--poult

   Discuss the fact that all birds are hatched from eggs.

3. Draw, cut out, or paint a series of pictures that tell the story of barnyard fowl from the egg in the nest to the stage when the young bird is able to fend for itself. Write a sentence or two about each picture.

4. Set up an aquarium that has 5-6 snails and about 10 freshwater plants. Have the children observe the seaweed daily under magnification to note any eggs that may have been deposited.

   What do they look like?

   Remove the seaweed and eggs; place this in another container of water. Watch daily to see when the eggs begin to hatch. Use a magnifying glass.

5. List all the animals they know that are not covered with fur:

   birds
   insects
   frogs
   snakes
   fish
   worms

   Discuss the fact that most of these animals lay eggs.

6. Secure frog eggs from a pet store. Place them in a bowl of water and observe them daily.

7. Bring in spider sacs which may usually be found in the garage or basement. Carefully take one apart. Use the hand lens to examine the eggs. Place another spider sac in a jar. Cover the jar with gauze and observe daily.

CONCEPT: Some animals are born alive.

1. List all the animals they know that are covered with fur.

   What are the babies called?

   dog--puppy
   cat--kitten
   horse--foal
   cow--calf
   pig--piglet
   sheep--lamb
   rabbit--bunny
   goat--kid

   Discuss the fact that most animals that have fur (hair) covering bear their young alive.

2. Display pictures of mother animals and their babies. Compare the ways in which most of the animals that are born alive resemble their parents.

3. Discuss the care of the very young.

   Who feeds them?
   What does the mother give them?

4. Ask the librarian to help the children to find a good story about a puppy, kitten, or some other baby animal to read to the class.

5. Have the class write poems about their pets or favorite farm animals that bear their young alive.

6. Pupils can make up their own riddles. See if the class can guess them.

7. Arrange a visit to a local pet shop. Find out about the guppy fish.

   How does it differ from most other fish in the way in which it has young?

   Report to the class.

CONCEPT: Some animals are raised by man and are tame. (Domestic)

1. Set up a display of pictures and/or models of domestic animals of this region (cow, dog, cat, sheep, pig) and wild animals as we think of them (lion, tiger, crocodile, snake). Let the pupils study, discuss, and separate the animals into two groups. (Books from the ten cent stores are good sources of pictures.)

2. Discuss wild animals sometimes cared for in our country in zoos, open-air wild life museums.

   Does this make them tame animals like the dog, cat, cow, or horse?
   What is the difference?

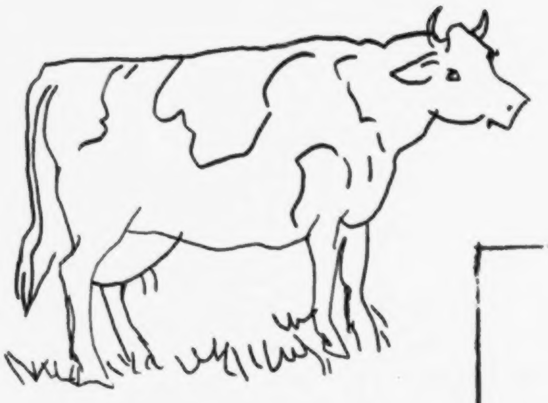
3. Discuss: animals that man raises that also live in the wild state (rabbits, minks, foxes); animals that are not used in our country but are sometimes used in other countries to help man (elephants, camels).

4. Make the transition from the words tame animals to domestic animals.

5. Tell the class the story of the early horse, the Eohippus, which was no bigger than a fox.

6. Make a list, or collect pictures, of all the domestic animals known to the children. Sort them into three groups as follows:

   animals that are pets
   animals that are "workers"
   animals that give us food or materials.



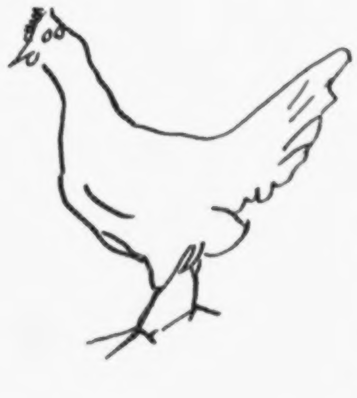
The Cow

The cow gives us milk.
We need milk to grow strong.
The cow is a nice animol.

Children write simple stories and poems:

Chickens

Little chickens say, "peep, peep."
They are lots of fun to keep.
They lay eggs for you and me.
Chickens are fun to watch and see.



7. Write and illustrate simple compositions about animals for their science books.

8. Tell stories about their pets, their behavior, their tricks and their care.

9. Collect pictures of cats and dogs. Compare the cat and the dog. Both have:

   fur to keep them warm
   four legs to walk and run
   sharp teeth so they can eat meat
   babies- the dog, puppies; the cat,
     kittens

10. Read stories about animals in books from the library.

11. Plan a trip to a local farm. Some have special accommodations and interest for groups of children.

12. Make a papier-mâché farm exhibit.

13. Prepare a program around the exhibit and invite other groups to attend.

CONCEPT: Domestic animals eat plants and other animals.

1. Discuss ways pets and farm animals eat and drink:

   Poultry have no teeth and lift water in their bills,
     letting it run down their throats.
   Pigs, horses, cows suck in water and then
     swallow.
   Cats and dogs use their tongues for drinking
     milk and water.
   Dogs eat meat in chunks.
   Cows chew cud.

2. Using any available sources of information, including books from the library, pupils can find out what plant foods farm animals eat. Record the information in pictures and sentences.

3. As a class project make a picture chart of farm animals. Opposite the pictures illustrate or tie actual specimens of the most important plant foods they eat.

4. Some children have spent summers on farms. Let them tell about corn, wheat, and other field crops. Discuss the silo and the haymow in the barn.

   Why does the farmer store some of his harvest?

5. See if you can find out why pigs like to wriggle in the mud.

   Are pigs really dirty animals?
   How does the pig's snout help him?

6. Make a scrapbook using old magazine and catalogue pictures and children's drawings. Call it "My Farm" or give it a favorite name such as "Three Oaks Farm." Paste in or draw pictures of

   the farmhouse
   fences, trees, bushes, grass
   barns
   animals
   fields
   people
   planting, harvesting

7. Write a story about some farm or house pet. Illustrate it and make a cover for the booklet.

8. Find out more about one special animal such as the cow, pig, or chicken. Find out about its sense of smell, how it hears, type of teeth, what it eats, kind of covering, and anything special that makes it different from other animals. Write a story about it an read it to the class.

CONCEPT: Domestic animals give us food and other products.

1. List the foods we eat that come from animals.

2. Make a pictorial chart of the animal products we like to eat for breakfast, for lunch, for supper.

3. Write stories with such titles as:

   "Why We Are Grateful to the Cow"
   "How Sheep Share Their Coats with Us"
   "The Busy Bee Is Good to Me."

4. Display pictures of animals and the foods we get from them. Let the pupils connect the food with the animal using a streamer.

5. Develop a similar bulletin board about other animal products.

6. Talk about leather.

   Where does it come from?
   How do we use it?

   Make a chart of leather products.

7. Choose five common domestic animals and prepare a scrapbook about their contributions to our way of life. Illustrate the scrapbook with original drawings and/or magazine and newspaper clippings.

8. Report to the class about the use of dogs as guides for the blind and as guard dogs.

9. After gluing colored animal pictures to cardboard, cut them into jig-saw puzzles for classroom use. (These puzzles may later be donated to kindergarten or first grade rooms.)

Cow Ways

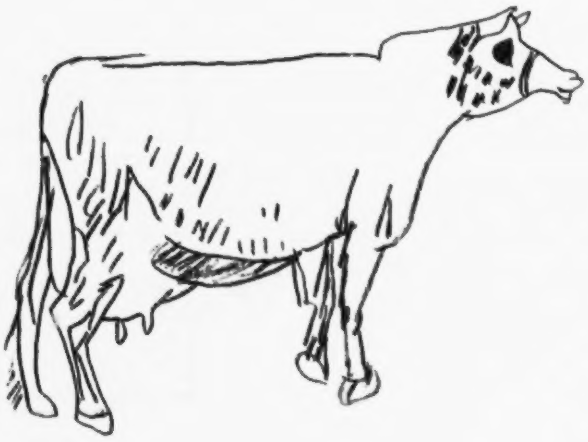
What do you think our mother cow did
  When she had a calf one day?
She took it out in the pasture and hid
  It snugly and safely away.

It wouldn't answer our pleading call,
  And it wouldn't move a bit.
And maybe we wouldn't have found it
  at all
But the cow led us straight to it.

And Father put it over his arm
  And patted its sleek red hair,
And told it it couldn't come to harm
  While he and the cow were there.

So we carried it back to the barn,
  and now,
Out there in a warm, dry pen,
  It romps around beside the cow,
Then sleeps and romps again.

Euola Chamberlin



SCIENCE VOCABULARY:

A baby cow is a c______.
Animals that are not wild are t______.
When a chick comes out of the egg it is h________.
A baby horse is a f______.
The mouth of a bird is called a b______.
Cows like to eat h_____.
A baby cat is called a k_________.

SEATWORK SUGGESTIONS:

NAME ____________________

COW	PIG	SHEEP	CHICKEN
eggs beef	wool cheese	butter milk	pork leather

Directions: Place the product under the name of the animal from which it comes.

CONCEPT: All birds are alike in many ways.

1. Bring in feathers. (Pigeon, sparrow, starling, chicken, robin, canary, parakeet feathers are usually available.) Examine the shape, color, and texture. Look for soft down feathers.

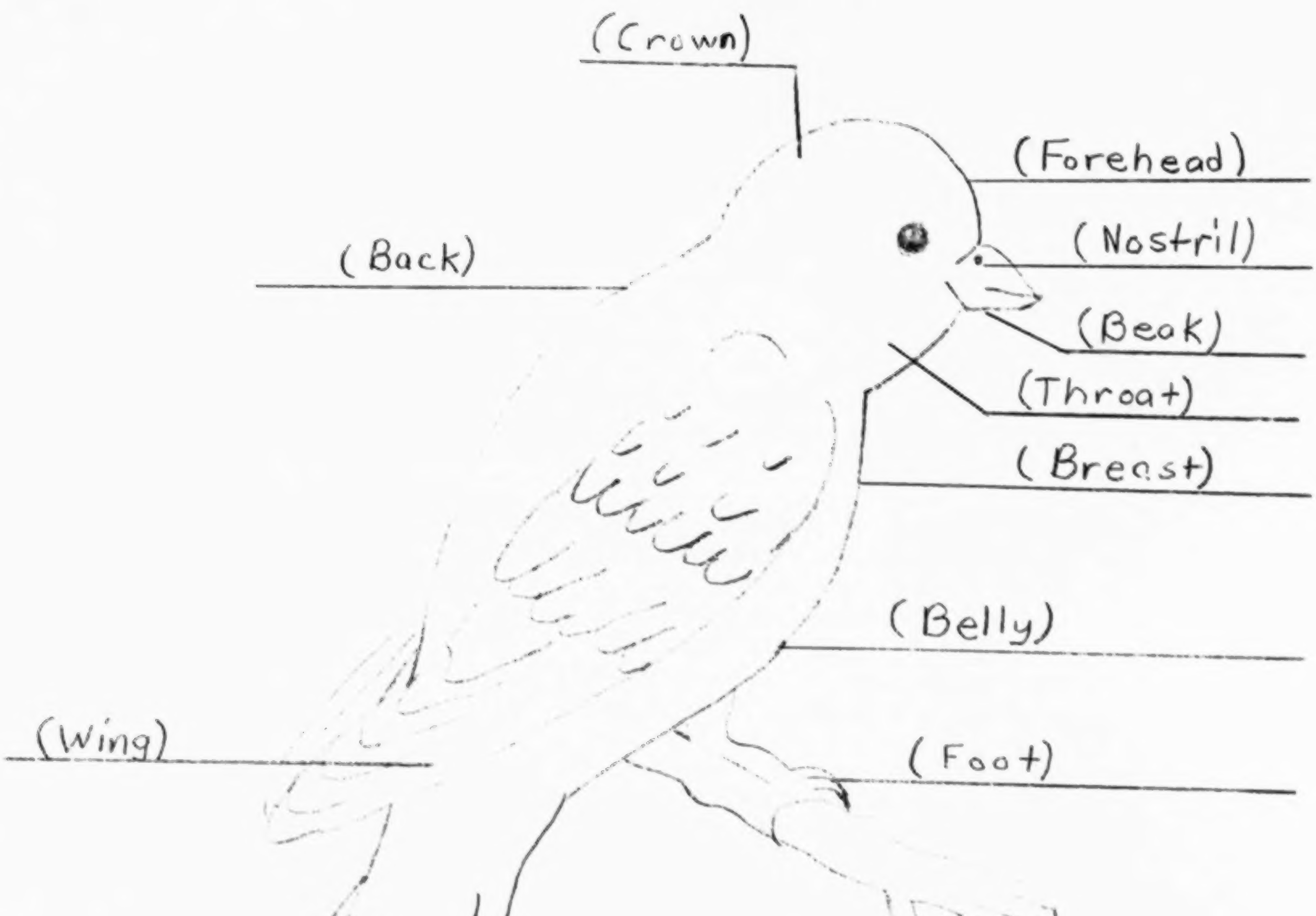
2. Place a drop of water on the feather. Observe.

   Does the feather get wet easily?

3. Provide outline of a typical bird. (See diagram.) Label all the parts. Discuss the fact that although all birds do not look alike, they all have two legs, two wings, a tail, two eyes, and a beak but no teeth.

Name

Parts of a Bird



4. Examine pictures of a variety of birds. Locate the wings, feet, and beak. Describe the color of the feathers on the crown, back, tail, breast, belly, and wings.

5. Start a room scrapbook of bird pictures.

6. Display pictures of such birds as the penguin, ostrich, kiwi, cassowary, and emu. Locate the wings. Discuss the fact that all birds have two wings even though a few cannot use their wings for flight.

7. Examine pictures of birds and describe the beaks.

   What color is the beak?
   Is the beak small or large in comparison to the size of the bird?
   Does the beak curve?
   Is the beak long and pointed?

8. Provide an outline of four common types of beaks. (See diagram.)

   What is each type of beak used for?
   What birds have these types of beaks?

   Label the diagram.

9. Talk about their experiences of being bitten by a pet parakeet or canary. List several birds with beaks shaped so that seeds can be crushed easily.

10. Display a picture of a robin, a woodpecker, a duck, and an owl (or other birds in the same families). Examine the feet.

    How many toes can you see?
    Are they arranged the same way?
    Which bird has very sharp claws?
    What do you think they are used for?

11. Provide an outline of the common types of feet. (See diagram.) List the birds that are climbers, the perching birds, the birds that are swimmers, and the birds that use their feet to grasp prey.

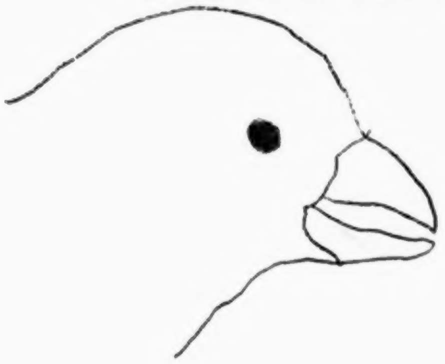
12. Talk about the kind of eggs. (Chicken , robin, sparrow, parakeet.)

    Where do the female birds usually lay their eggs?
    How do nests differ?
    How are the eggs kept warm?
    Are all birds' eggs the same size, color and shape?

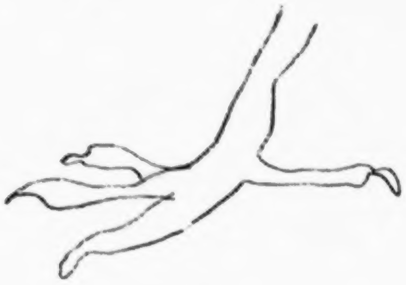
13. Bring in a chicken egg. Measure its length. Obtain information about the size of different types of eggs from the encyclopedia. Discuss the variety of sizes and colors of bird eggs.

Birds

Cracker Beak

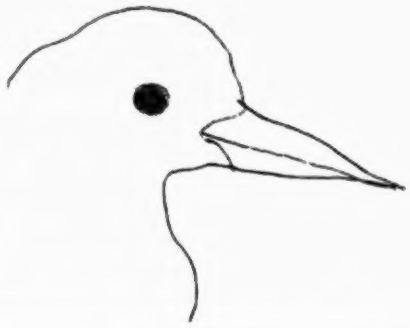


Perching Foot

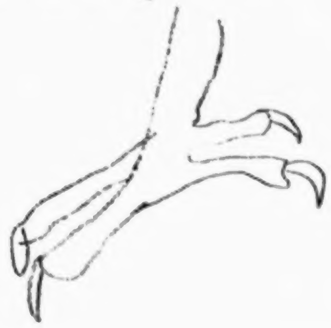


Sparrow

Chisel Beak

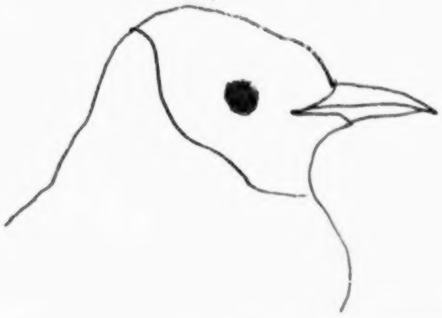


Climbing Foot

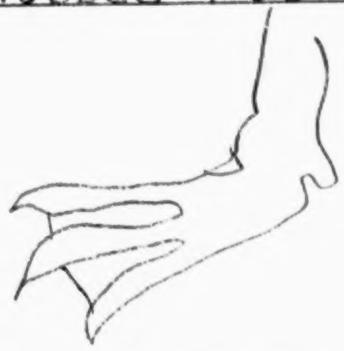


Woodpecker

Spear Beak

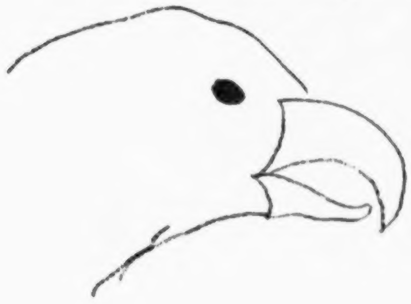


Webbed Foot

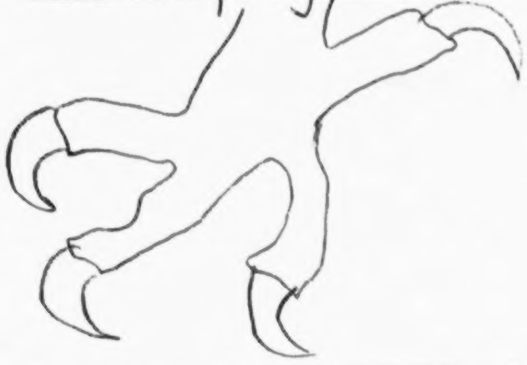


Gull

Tearing Beak



Grasping Foot



Eagle

14. Make models of bird eggs from clay such as:

    ostrich egg - 7" long
    hen egg - 2½" long
    robin egg - 1¼" long
    hummingbird - ¼" long

    Paint the eggs using information acquired from bird books and encyclopedias.

15. Have a "look and tell" session. Each child brings in a picture of a bird and describes the beak, type of feet, nest, eggs, and other information he has acquired.

16. Find out how bones of birds help them to fly.

17. Bird kits are available for many kinds of birds. Choose and obtain and assemble it for classroom display.

CONCEPT: Birds live in many different places.

1. Keep a list of all the birds seen around the neighborhood?

    What have you seen the birds eating?
    Have you ever tried to feed the
      birds in your neighborhood?
    What kinds of food can you give them?
    Have you seen any bird nests?
    Where?
    What do they look like?

2. Select a bird and make up a riddle about it. Let the class try to guess the bird.

3. Answer the question:

    Why don't we see robins at Christmas time?

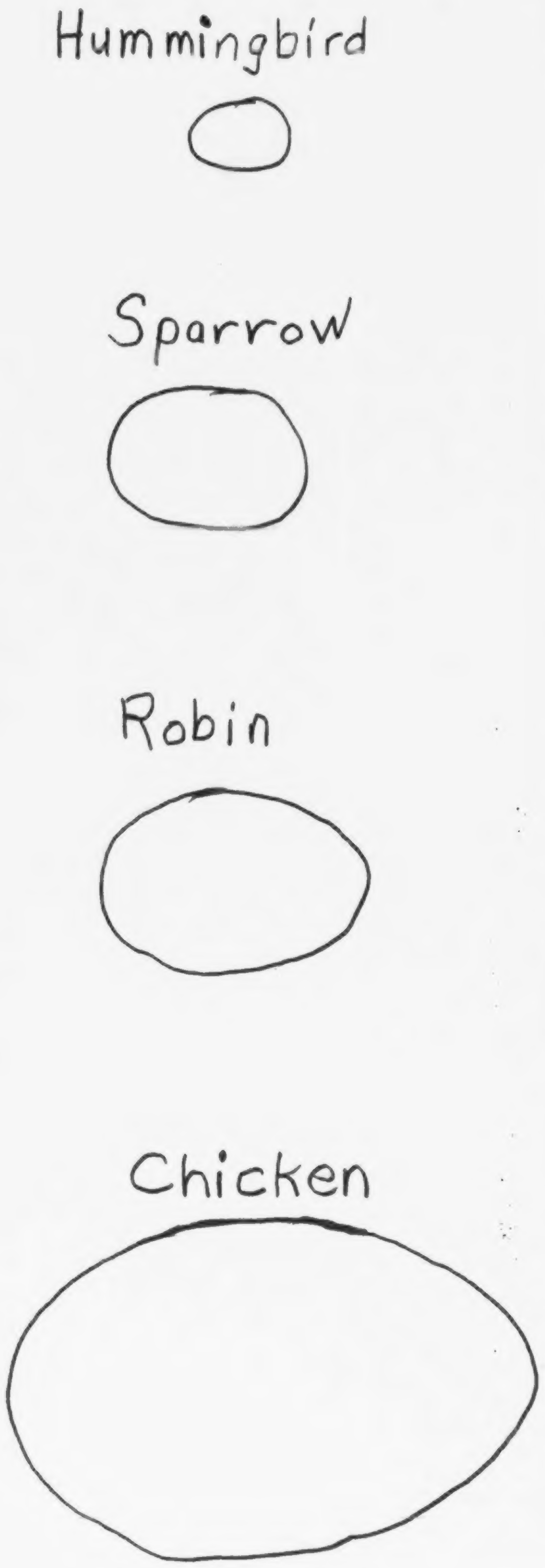
4. Recall the word "migration." Look it up in the dictionary and report to the class. Add the word to the room science dictionary.

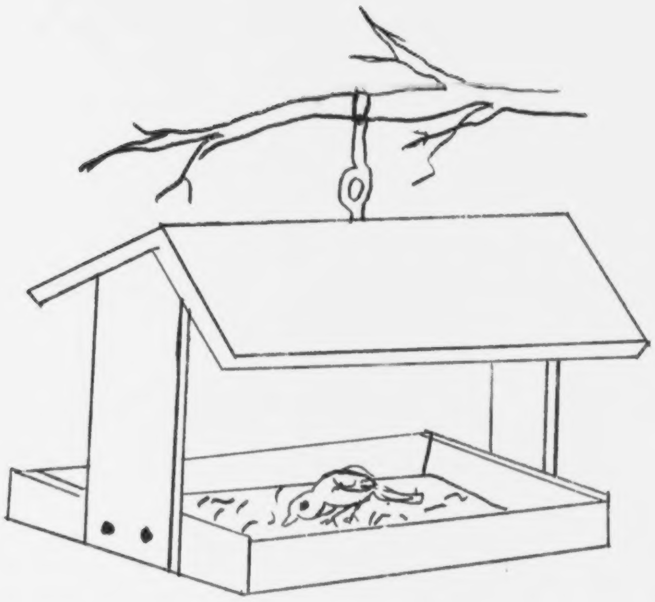
5. Obtain a chart showing the migration of birds. Consult books from the library and encyclopedias.

6. Make a calendar showing birds seen throughout the year. Learn which of these birds are permanent residents of our area and which are migratory birds.

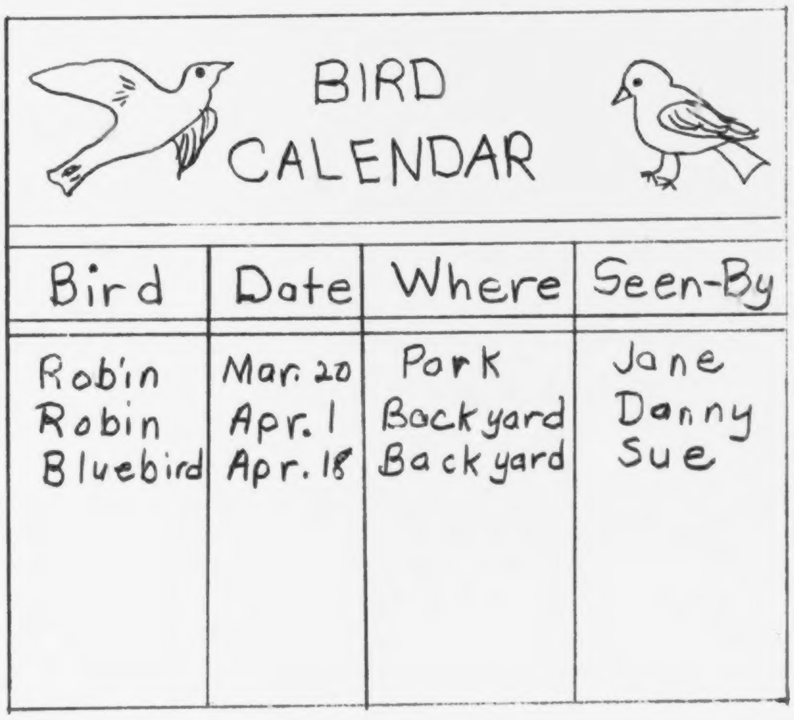
7. Make a list of ways people can help winter birds find food.

Compare the Size of Bird Eggs





Bird.Feeder



BIRD CALENDAR

Bird	Date	Where	Seen-By
Robin	Mar. 20	Park	Jane
Robin	Apr. 1	Backyard	Danny
Bluebird	Apr. 18	Backyard	Sue

8. Construct a feeding station for birds. Include seeds, suet, popcorn, peanut butter, and water. Report about the birds that have used your feeding station.

CONCEPT: Most birds are useful to man.

1. Find out what the birds in this area eat. List those whose food consists mainly of insects, and those whose food consists mainly of weed seeds

2. Make up meal cards for such birds as the robin, woodpecker, sparrow, cardinal. Display these cards on the bulletin board or in a pocket chart.

3. Make a list of harmful insects eaten by birds:

    potato beetles
    tussock moths
    tent caterpillars
    mosquitoes
    aphids.

4. Read and report on hawks to learn which hawks are harmful and which are beneficial.

5. Display pictures of owls. List the ways an owl differs from a robin: size, shape, eyes, beak, feet, food.

6. Construct a chart that shows which birds man uses for food.

7. Use 4 in. x 6 in. cards to illustrate the uses of feathers (down for pillows, sleeping bags, trimmings on hats, dusters). Place the cards in a pocket chart or on the bulletin board.

CONCEPT: Some cold-blooded animals go through different stages of growth.

1. Obtain a goldfish from the local store or pet shop. Place it in an aquarium. Point out the main parts of the goldfish. Discuss each.

2. Construct a large paper fish which can be dismantled and assembled on a flannel board. Each fish part should be labeled or numbered. See illustrated suggested outline of a fish. Label the parts:

    head
    scale
    tail
    fins
    gill cover

3. Obtain some frog eggs from a scientific supply house or local pet store. Place them in an aquariun of pond water, green plants, and gravel. (If pond water is not available, be sure to allow tap water to stand for 24 hours.) Observe the frog eggs daily

to watch for the development of the tadpoles. Fed the tadpoles pieces of lettuce, tiny bits of hard-boiled eggs, or fish food. Keep a record of the development of the tadpoles.

Which legs appear first?
What is happening to the tail?

Provide a means for the frog to get out of the water.

4. Make a series of pictures showing the frog's complete growth and development.

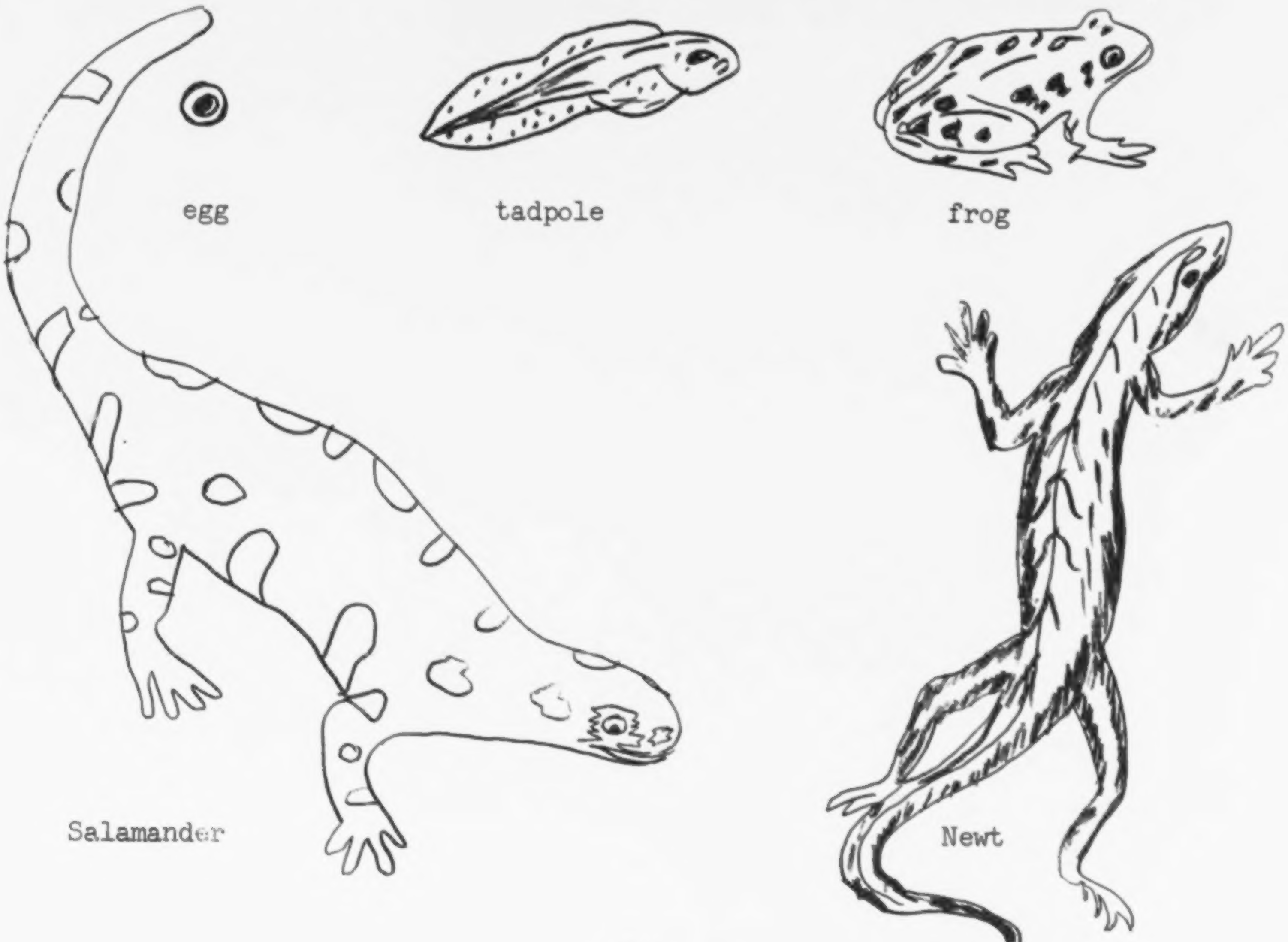
5. Obtain newts from an approved scientific supply house or local pet shop. Observe the newt's growth.

6. Collect pictures of frogs, newts, and salamanders for the amphibian section of a "Cold-blooded Animal" bulletin board.

7. Read and report on:

    frogs
    toads
    newts
    salamanders

DEVELOPMENT OF THE FROG



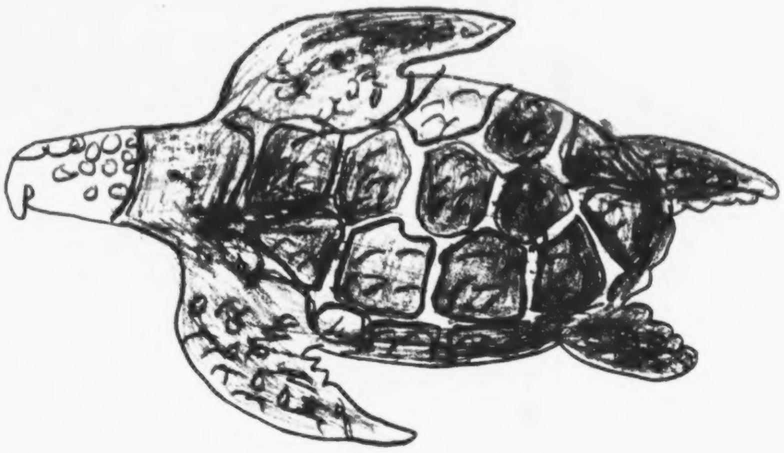
8. Obtain a baby turtle from the local store or pet shop. Place it in a turtle bowl or an aquarium with enough water so that the turtle may submerge itself. Place a flat rock or other platform for the turtle to rest on when he crawls out of the water.

9. Collect pictures of lizards, snakes, alligators, and crocodiles for the reptile section of a "Cold-blooded Animal" bulletin board.

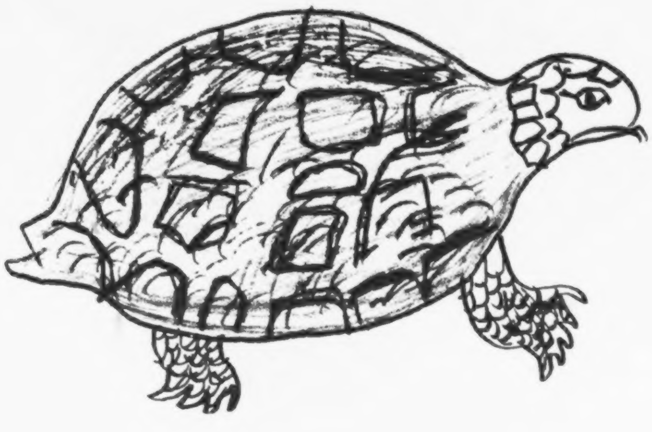
10. Read and report on:

    lizards
    snakes
    turtles
    alligators
    crocodiles

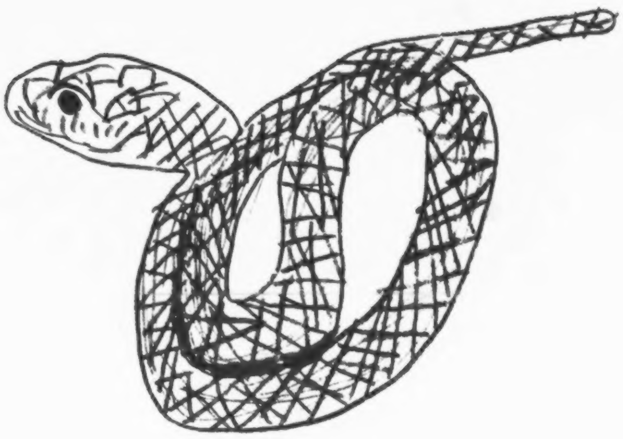
11. Plan, draw, and paint a three sectioned mural on the growth and development of turtles.



THE GREEN TURTLE
(WATER TURTLE)



THE BOX TURTLE
(LAND TURTLE)



GARTER SNAKE
(A SNAKE THAT BRINGS FORTH ITS YOUNG ALIVE)

CONCEPT: Cold-blooded animals have different ways of moving, eating, and protecting themselves.

1. Use an experience chart to guide observation of live goldfish. Discuss these possible titles:

   How do goldfish breathe?
   What are the gills?
   Where are the fish's fins?
   How many fins does the goldfish have?
   How does the goldfish learn about the things around him?
   How does the goldfish move?
   How does the goldfish eat?
   How do goldfish protect themselves?

2. Discuss how fish are like people in some ways and how they differ in other ways.

3. Advise in the selection of a variety of fish pictures for the fish section of a "Cold-blooded Animal" bulletin board.

4. Develop an information sheet for individual seat work; explain how fish, amphibians, and reptiles move, eat, and protect themselves.

5. Observe how the cold-blooded animals protect themselves. Write an experience chart with the children on how fish, amphibians, and reptiles protect themselves.

   Information chart:

	LOCOMOTION	FOOD	PROTECTION
FISH	Fins and tail are used for swimming	Plants, worms, water insects, fish	Coloration, speed
FROG	Has four legs for hopping, jumping, and swimming	Insects, worms	Coloration, jumping, speed
SALAMANDER	Has four legs for crawling, and swimming	Insects, worms	Coloration, hiding, speed
SNAKE	Strong muscles enable movement from side to side	Eggs, animals	Coloration, speed
LIZARD	(Usually) Has four legs used for walking, climbing, and running	Insects, sometimes small animals	Coloration, speed. sometimes a spiny covering
TURTLE	Has four legs for walking and swimming	Plants, insects, snails, worms	Coloration, pulls soft body parts into its shell.

6. Set up a balanced aquarium. An aquarium is a place where water plants and water animals live together. An aquarium which has the proper amount of plant life in proportion to the animal life is a balanced aquarium. The plants and animals are dependent upon each other. The animals get food and oxygen from the plants, while the plants get carbon dioxide from the animals and air from the water. Without plants the animals would soon use all of the oxygen.

7. Keep a toad and a frog in a terrarium for a few days. Observe how they eat, breathe, and move about.

8. Make up experience charts developing observations of the adult toad and frog. Discuss:

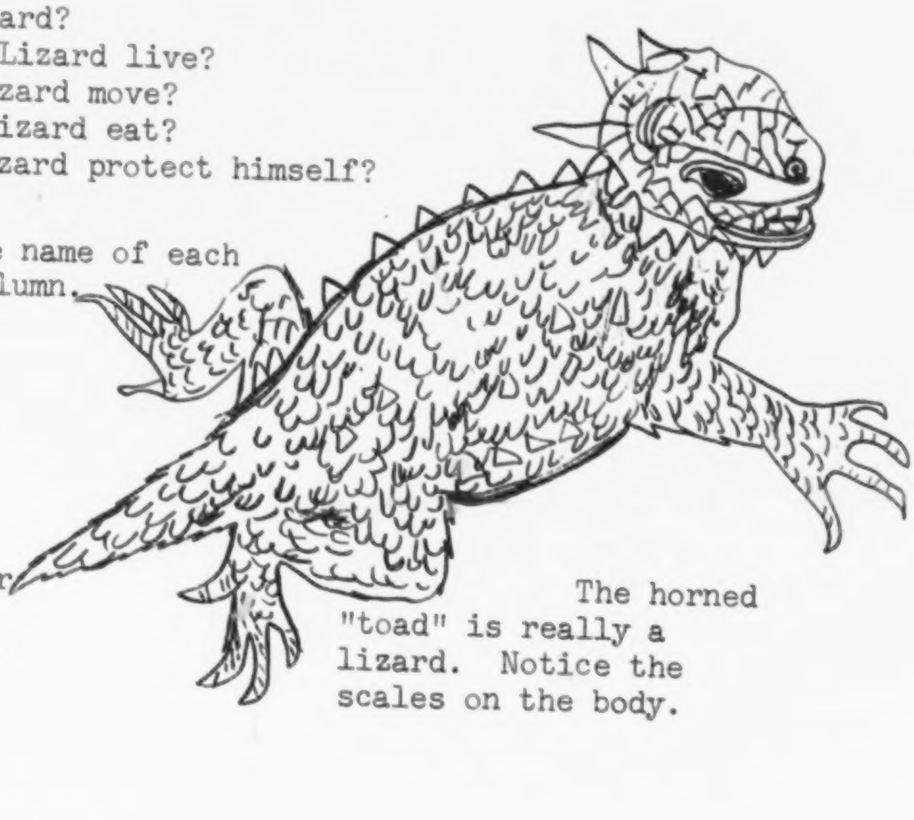
   How do toads and frogs breathe?
   How do toads and frogs catch insects?
   How do toads and frogs eat?
   How do toads and frogs move in water?
   How do toads and frogs move on land?
   How do toads and frogs protect themselves?

9. Have a terrarium for turtles. Feed them and observe their actions.

10. Collect pictures of lizards for the reptile section of the "Cold-blooded Animal" bulletin board.

11. Write a lizard story on the chalkboard. A suggested title might be "Mr. Lizard." Discuss:

   What is Mr. Lizard?
   Where does Mr. Lizard live?
   How does Mr. Lizard move?
   What does Mr. Lizard eat?
   How does Mr. Lizard protect himself?



SUGGESTED SEATWORK: Place the name of each animal in the correct column.

FISH	AMPHIBIAN	REPTILE

frog
guppy
salamander
lizard
tuna
snake
goldfish
turtle
alligator
toad
dinosaur
newt

The horned "toad" is really a lizard. Notice the scales on the body.

12. Examine a piece of snake skin, a turtle's shell, the scales on the neck and legs of a turtle.

13. Bring in items made of alligator skin for the children to examine and feel.

14. Draw pictures of alligators in their natural habitats.

Crossword puzzle:

COLD - BLOODED ANIMALS

▨	1		5		7		▨	▨
▨	▨	▨		▨		▨	▨	▨
▨	6	▨		▨		▨	▨	9
2				▨		▨	▨	
▨		▨		▨	▨	▨	▨	
▨		▨		▨	▨	▨	▨	
▨	▨	▨		▨	▨	3	▨	
▨	▨	3						
▨	▨	▨		▨	▨		▨	▨
4				▨	▨		▨	▨

ACROSS
1. The bodies of reptiles are covered with these. (scales)
2. Cold-blooded animals that always live in water. (fish)
3. A young, undeveloped frog. (tadpole)
4. All lizards have four of these. (legs)

DOWN
5. Animals that live part of their lives in water. (amphibians)
6. Fish use these to move. (fins)
7. Most cold-blooded animals lay these. (eggs)
8. This is a type of amphibian. (toad)
9. This reptile can be a good pet. (turtle)

CONCEPT: Some cold-blooded animals breathe under water; other do not.

1. Fill a transparent container with cold water. Let the cold water stand overnight in the classroom. Ask the children to look at the water. They will be able to see bubbles of air suspended along the sides of the container.

2. Construct a large outline of a fish head with a cut out of its gills. Explain how the fish breathes.

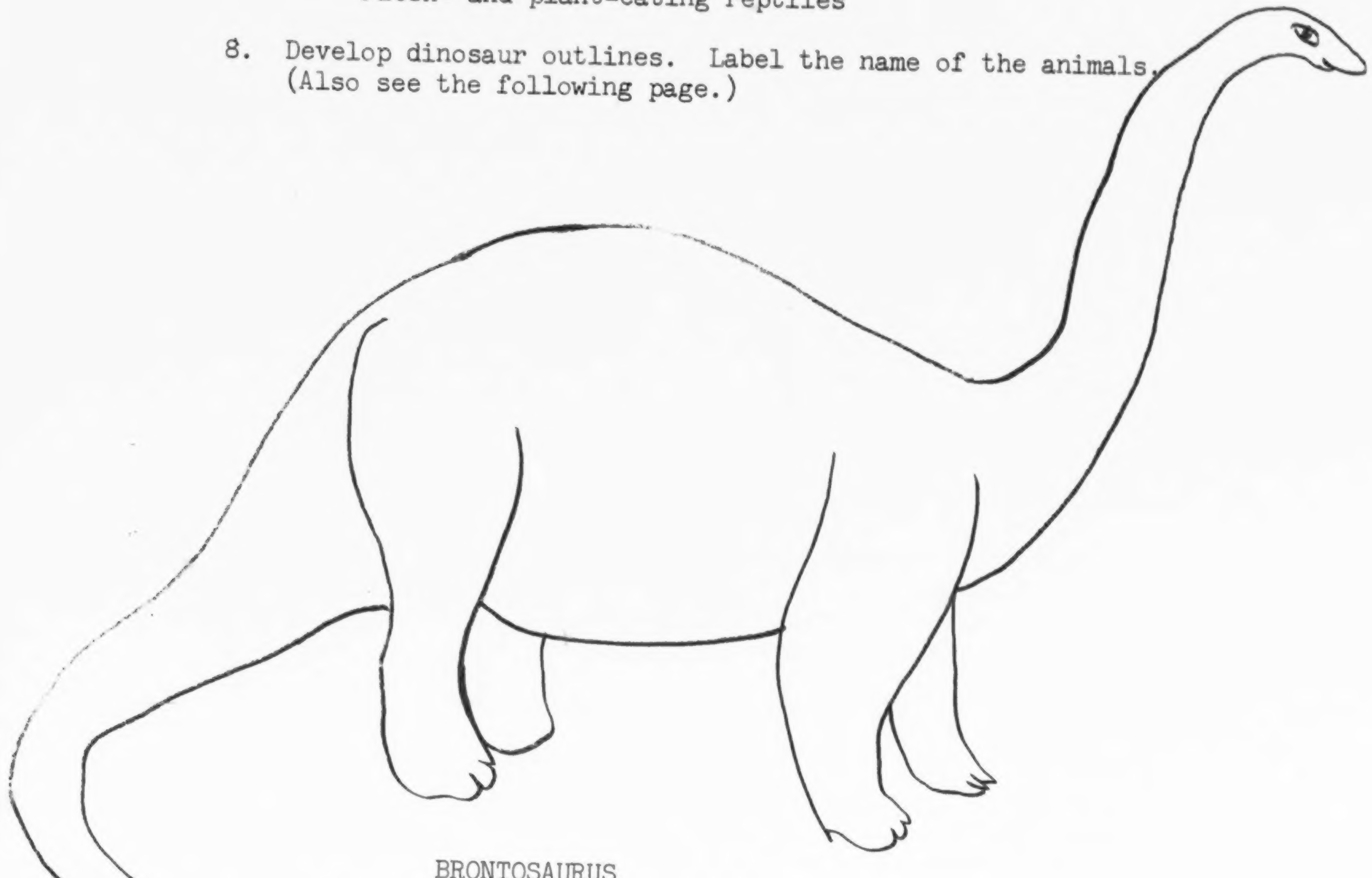
3. Duplicate simple drawings of cold-blooded animals that breathe under water and those that do not. Label and color each outline picture. Discuss.

CONCEPT: Most cold-blooded animals living today are different from those which lived long ago.

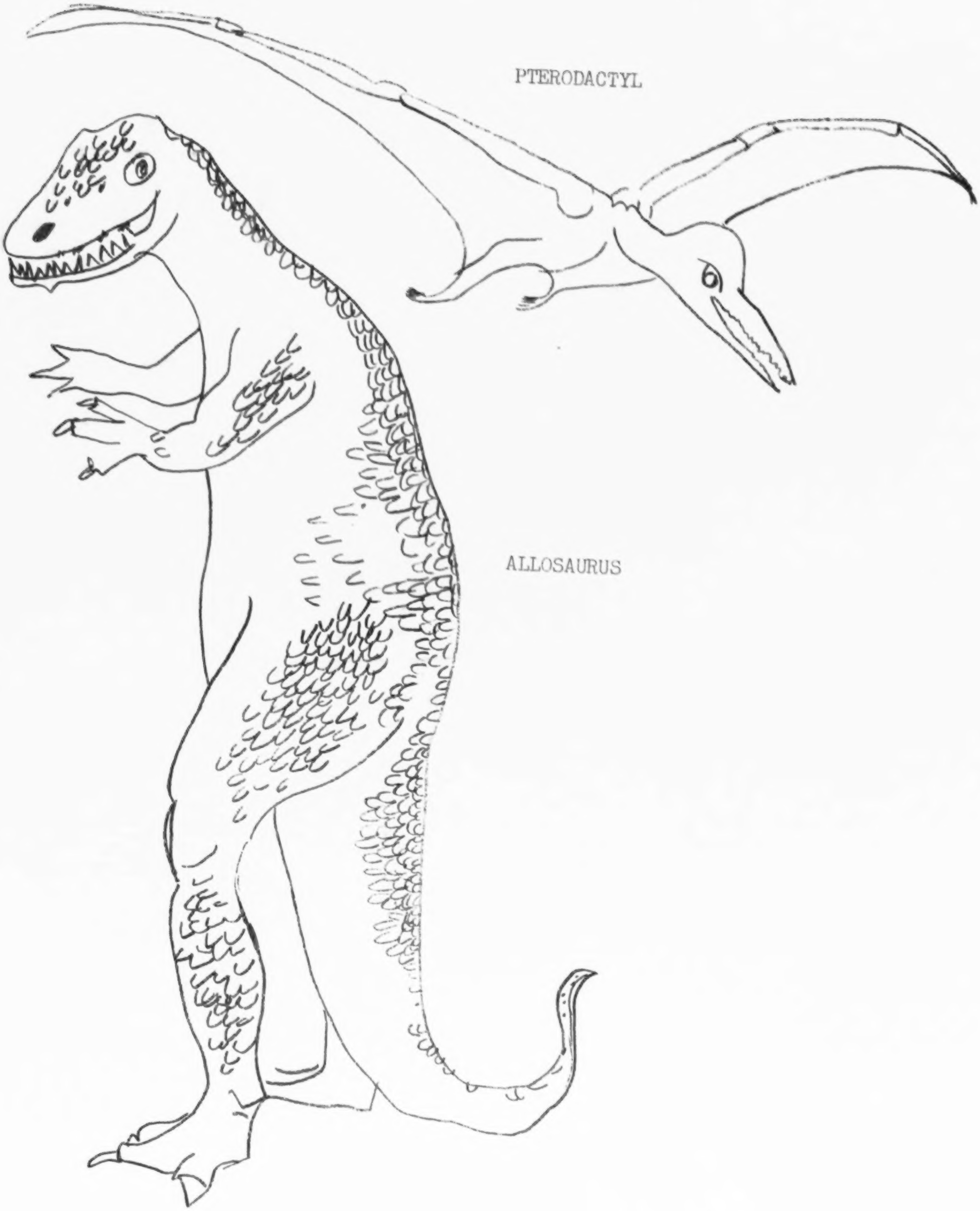
1. Compare pictures of present-day reptiles and ancient dinosaurs. Use opaque projector if one is available.
2. Compile a room scrapbook of pictures of reptiles that lived in ancient times.
3. Make plaster models from rubber molds of dinosaurs. Many children have these molds in model building sets.
4. Construct dioramas showing life during the Age of Reptiles.
5. Bring in models of dinosaurs and dinosaur skeletons which are available in many of the stores. Set up a display table. Have a naming contest.
6. Select one dinosaur to model from clay or from papier-mâché.
7. Arrange a bulletin board display. Sections could include:

    Flesh-eating reptiles
    Plant-eating reptiles
    Flesh- and plant-eating reptiles

8. Develop dinosaur outlines. Label the name of the animals. (Also see the following page.)



BRONTOSAURUS

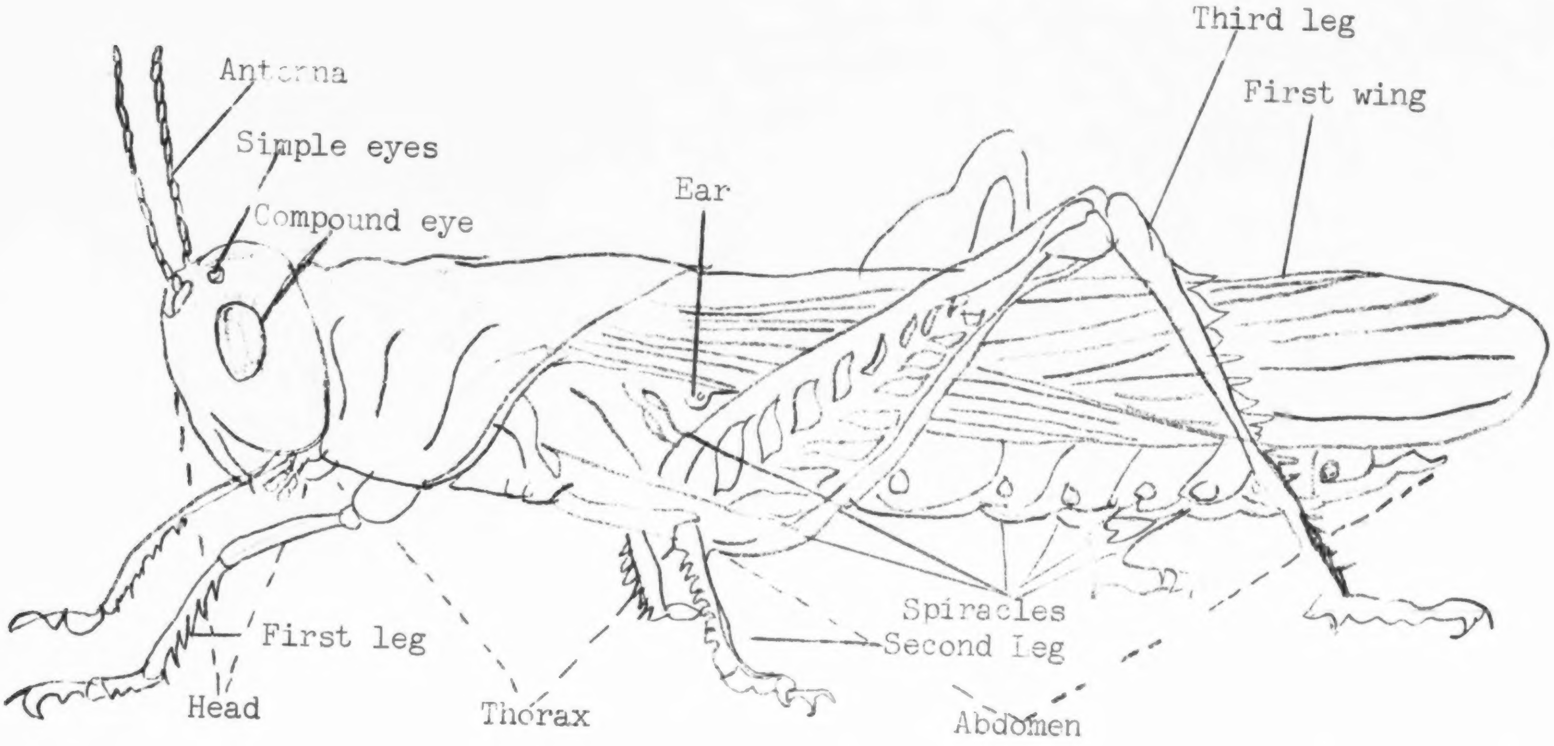


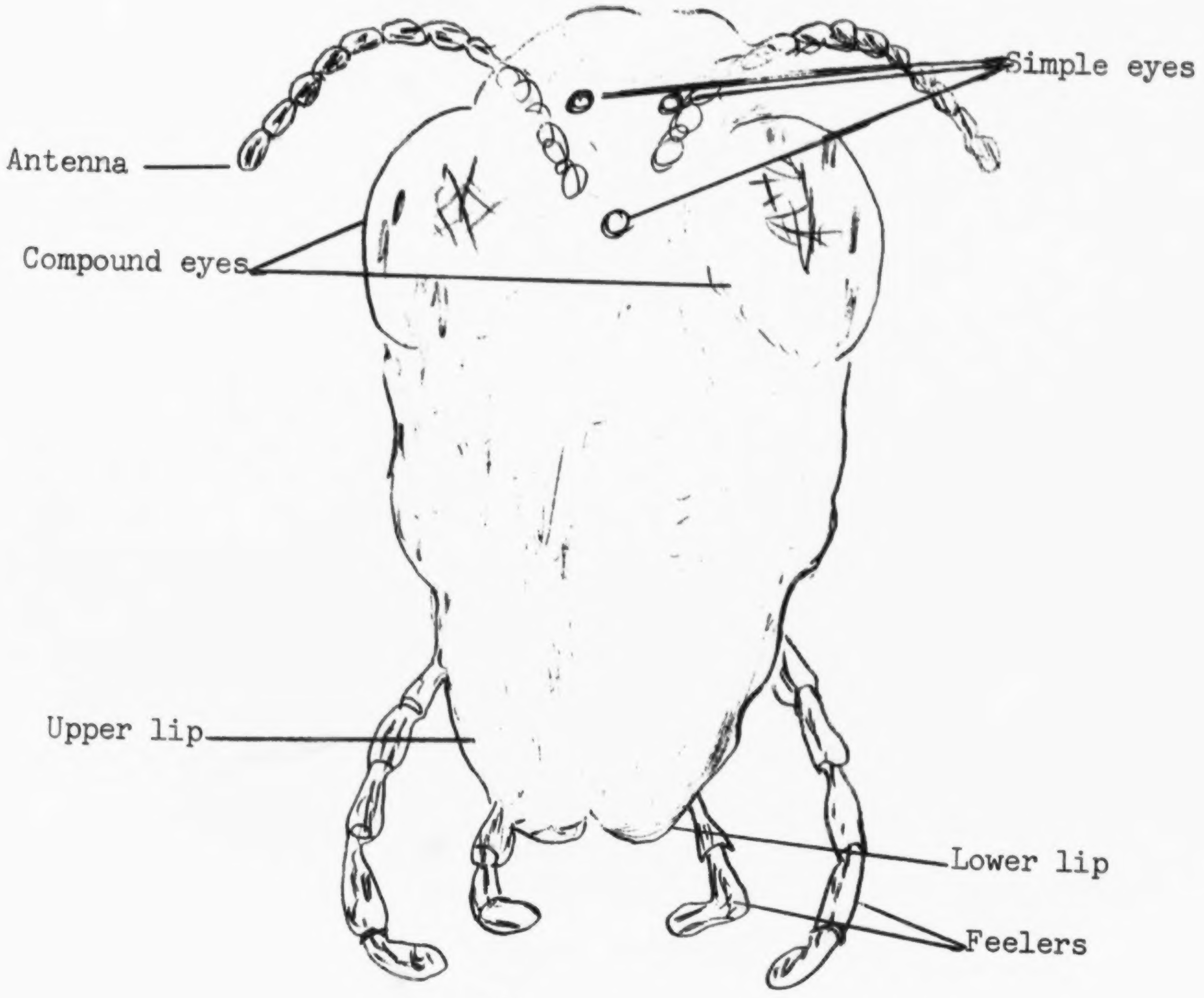
9. Read stories and obtain other information from books. Report to the class on the information obtained.

CONCEPT: There are many kinds of insects.

1. Make a large diagram of a grasshopper and label all parts.
2. Bring a grasshopper to school. Use a hand lens to identify and locate the number of legs, wings, and antennae.
3. Place one antenna on a slide and, using the microprojector, observe it under low power. Repeat this activity using the legs and wings of the grasshopper.
4. Make a diagram of a grasshopper and label it. Make a list of the reasons why the grasshopper is called a typical insect.
5. Locate the tiny openings (spiracles) on the abdomen of a live grasshopper to observe how it breathes.
6. Point out that the hind legs of a grasshopper differ from the rest of its legs. Have each child examine a grasshopper, if possible.
7. Observe the leg of a grasshopper under the objectives of the microprojector. Project the image upon a screen or the wall.

GRASSHOPPER




HEAD OF GRASSHOPPER

8. Use a prepared slide to observe the mouth parts of a grasshopper under the microprojector.

   What do grasshoppers eat?
   Why do they need chewing mouth parts?

9. Examine the wing of a butterfly under the low power objective of the microscope or microprojector.

   Why do you think butterflies and moths are called "scaly winged"?

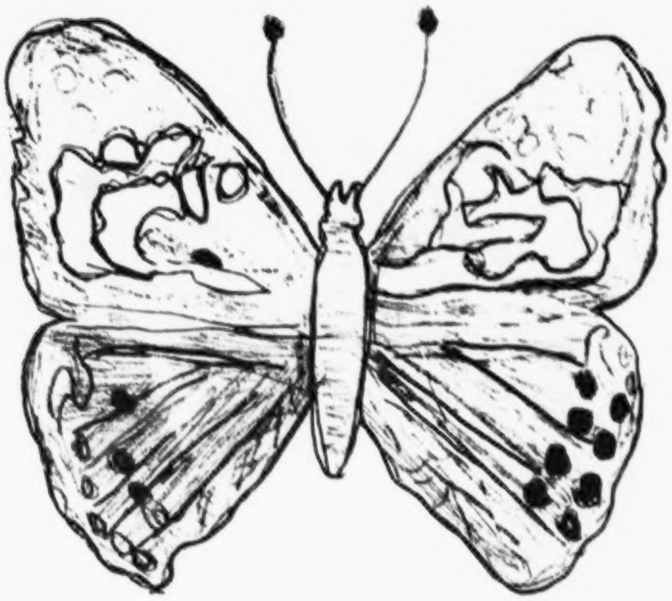
   Take a toothpick and scrape the wing of the butterfly. Catch the falling substance on a clear microscope slide and place it under the high power objective of the microprojector.

   What can be seen now?
   How do the scales enable the butterfly to fly?

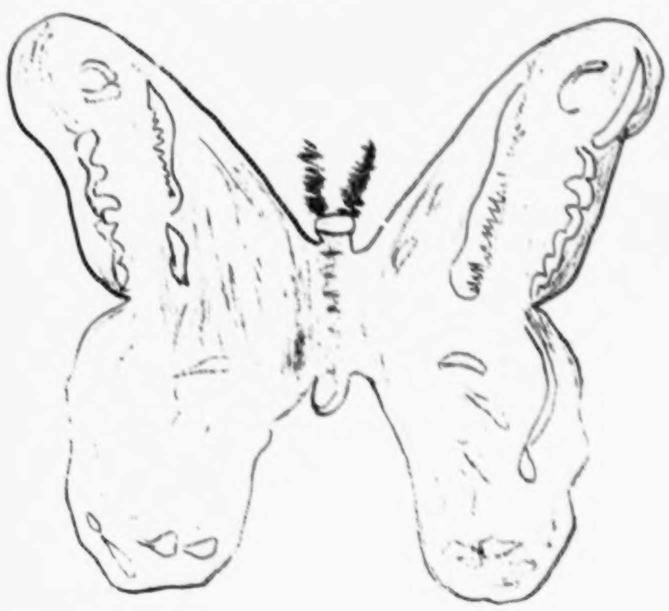
10. Bring in a moth and a butterfly. Place them side by side and compare them. Make a list of the differences.

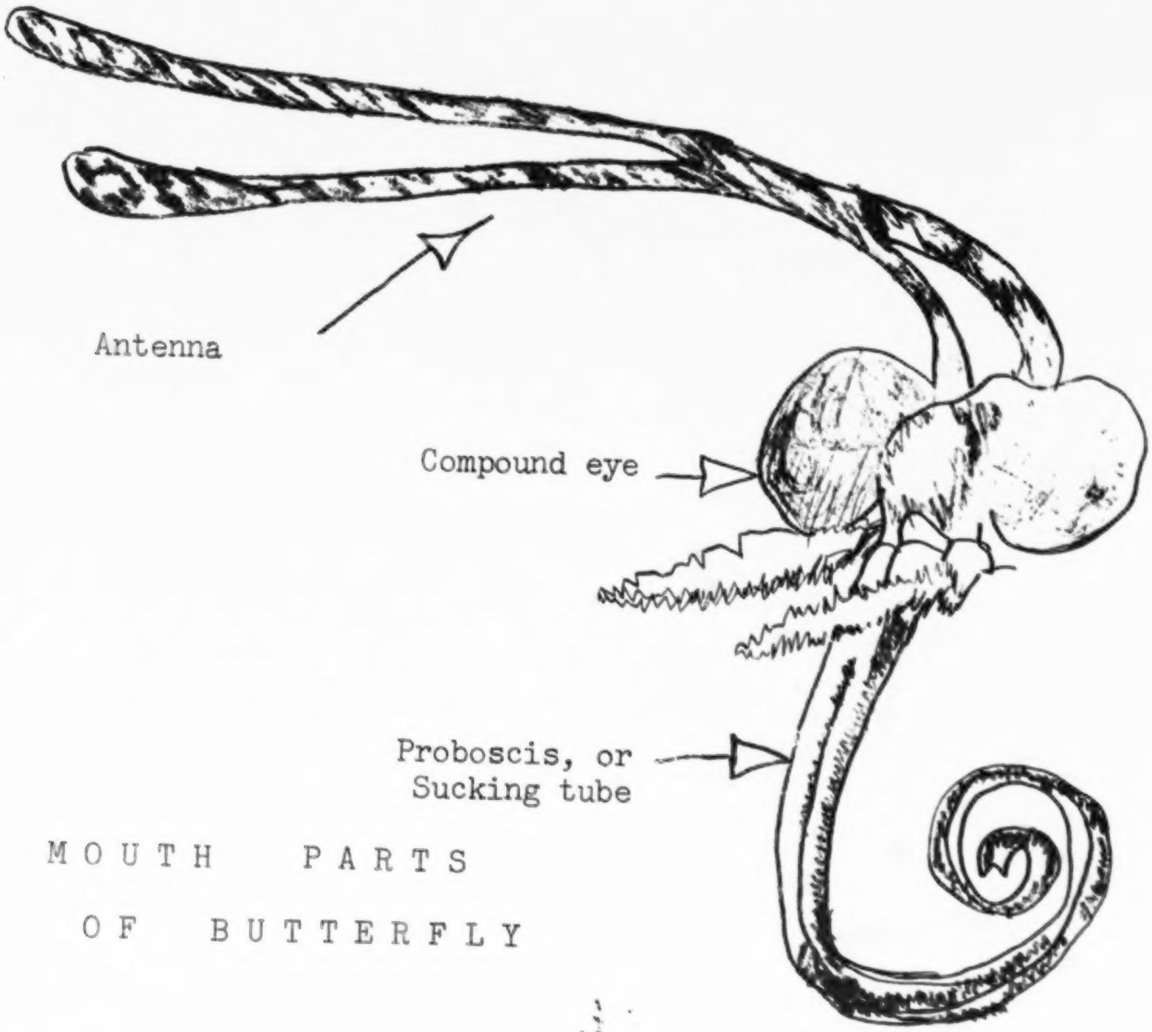
11. Obtain a butterfly and find the mouth part. Use a tooth pick to locate the coiled tube. Place the butterfly on a glass slide under the microprojector and elongate the tube. Release it and observe that it coils back like a spring.

BUTTERFLY



MOTH





MOUTH PARTS
OF BUTTERFLY

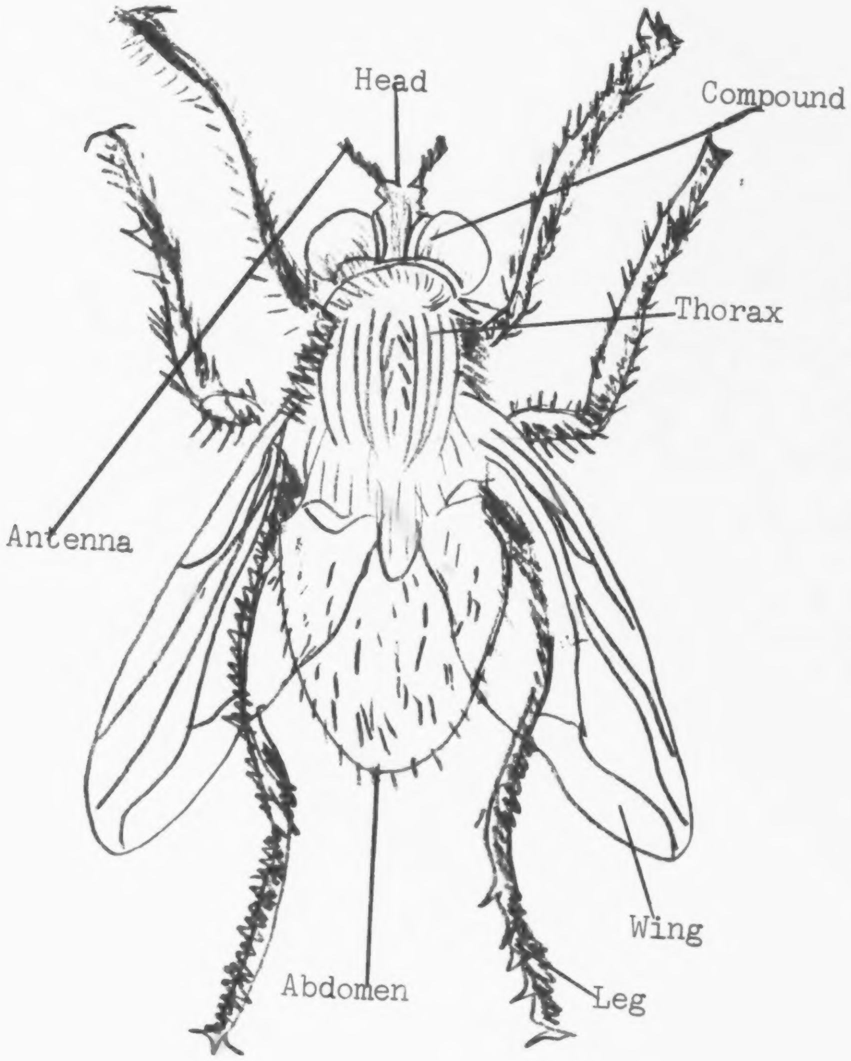
12. Place the antenna of a moth alongside the antenna of a butterfly and observe it under the microprojector. Have the children make a diagram and describe the differences.

13. Place a fly on a slide and observe it under the microprojector.

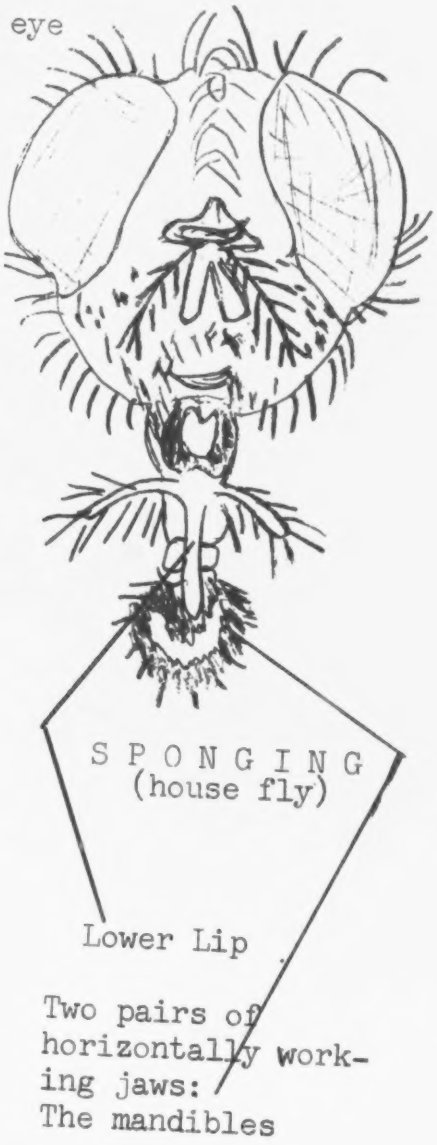
14. Point out that the housefly feeding upon a lump of sugar pours salivary fluid over it and then sucks up the resulting fluid.

    Why is it unwise to eat food that has been exposed to flies?

15. Use a prepared slide to observe the mouth parts of the fly.



HOUSE FLY

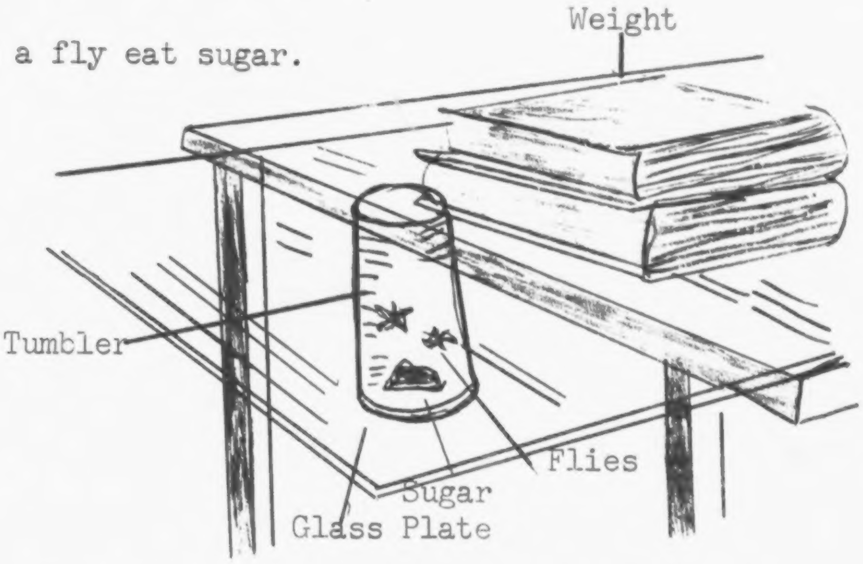


SPONGING (house fly)

16. Place a sheet of glass on a table with a weight on one end so that a part of the glass extends beyond the table. Put a small amount of sugar on a part of the extended glass.

Place two or three live flies under a tumbler inverted over the sugar.

How does a fly eat sugar.



17. Obtain a ladybird beetle and examine the hard, shell-like outer wings.

    Do these wings resemble the wings of other insects? Why not?

18. Use prepared slides to show parts of a beetle.

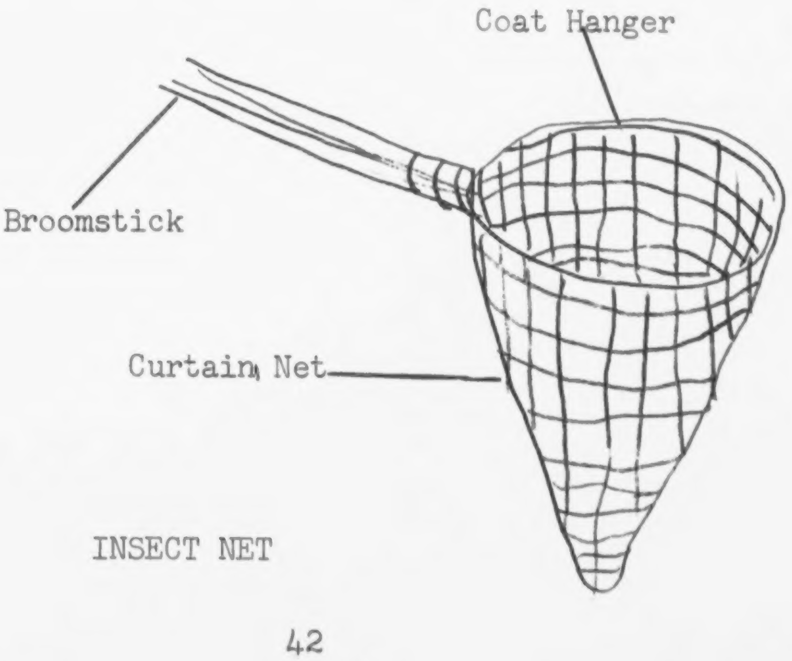
19. Explain why bees, wasps and ants are called social insects.

20. Construct an ant box as much like the ant's natural environment as possible. One side of the box should be glass, which is kept covered except when observing the community activities.

    Why do the ants establish paths?

21. Bring in a grasshopper, a butterfly, a housefly, an ant, a ladybird beetle, and a bug. Make a list of the characteristics that they have in common.

22. Make an insect net as shown below.

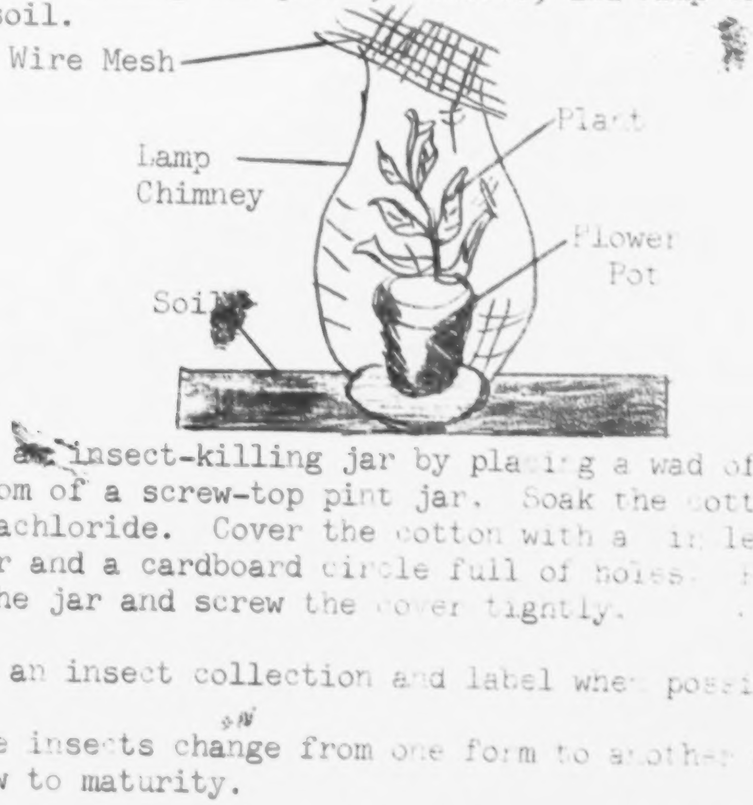


INSECT NET

23. Prepare a temporary container for housing live specimens. Use transparent plastic containers covered with wire screen or mesh to provide adequate ventilation and prevent condensation from obscuring the view of the interior.

24. Plan a short neighborhood trip with the class to collect local specimens. Use the container and insect net described above.

25. Make an insect cage using a green plant, a lamp chimney, a large container, and wire mesh. In it, place some of the insects gathered on a field trip. Cover with the lamp chimney. Bend the wire mesh over the top of the lamp chimney Pack the large container with soil and place the flower pot containing the plant, insects, and lamp chimney in the pan of soil.



26. Make an insect-killing jar by placing a wad of cotton in the bottom of a screw-top pint jar. Soak the cotton with carbon tetrachloride. Cover the cotton with a circle of blotting paper and a cardboard circle full of holes. Put the insects in the jar and screw the cover tightly.

27. Make an insect collection and label when possible.

CONCEPT: Some insects change from one form to another as they grow to maturity.

1. Provide living examples of metamorphosis whenever possible. Observe obvious activity and appearance in each stage. Keep a class log of observations. Living specimens may be kept in an insect cage or in clear quart-size jars. The latter type of container affords a greater opportunity for mobility and increases the number of individuals able to observe at one time.

INDIVIDUAL INSECT TERRARIUM

2. Bring live insect eggs to class. Record the location where the eggs were found. Force the hatching by keeping eggs as close as possible to room temperature (72° F) and humidity. The period of incubation will vary with the type of insect.

   Larvae or caterpillars that survive can be kept in an insect cage or individual bottles; for example, quart-sized mason or coffee jars or clear glass. This latter method of preservation will allow for greater mobility and a larger number of individual observations in the time allotted.

   Provide larvae with fresh vegetation, preferably with the kind upon which the organism (egg) was found.

   Keep a daily record of pupils' observations. Include answers for:

   How often do the caterpillars eat?
   Is there any particular pattern followed in the way leaves are eaten?
   At what point (number of days) do they stop eating and begin preparing for pupal stage?

   If the larva being used forms a chrysalis instead of a cocoon, describe only the apparent process of formation, and assign the task of finding information on and describing the cocoon formation.

3. Observe the pupa stage. Remove, by cutting with a scissors, enough material to provide sufficient light inside the cocoon, so that any changes in external characteristics may be observed. Using three cocoons, make openings in each and cover one opening with transparent material (cellophane or Saran wrap), one with opaque material, and leave the third "window" uncovered. Check for apparent changes daily and record the results as reported by the pupils.

   Do all specimens pupate?
   If not, what should be done before forming a judgment about the opening and its effect?

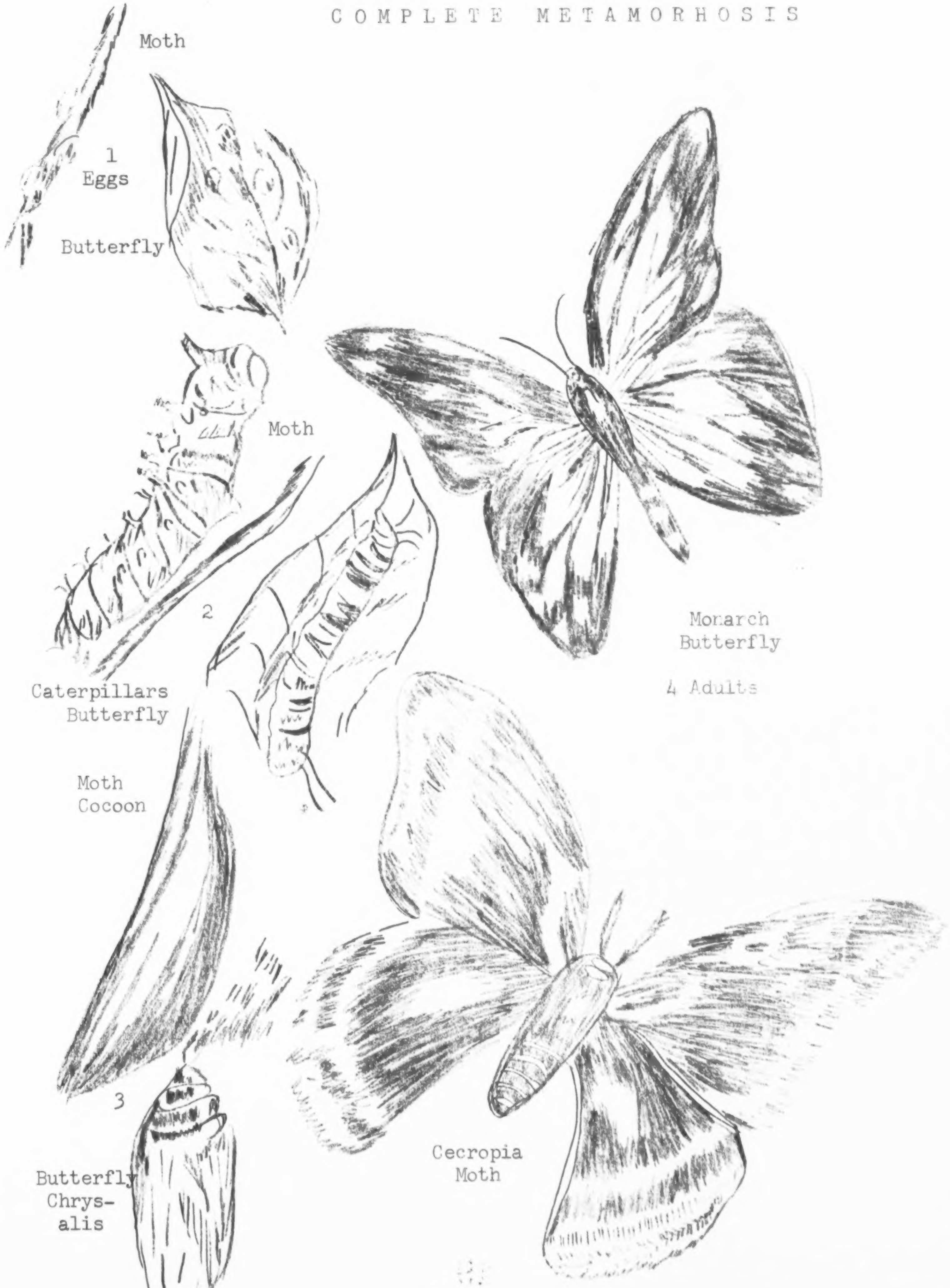
4. Make a chart, visible from all parts of the room, listing and illustrating insect life stages in complete metamorphosis.

5. Read and report on:

   Insect Homes
   How Insects Grow
   Insect Enemies
   Insect Allies (beneficial)

6. Obtain an ant colony and observe the work of the different ants.

COMPLETE METAMORHOSIS



7. Make a large scrapbook of insects. Include pictures, drawings, specimens, and written description of their life cycles.

8. List many of the places where insects can be seen.

9. Discuss the variety of places where insects live and ask the pupils why they differ in the selection of an environment.

10. Study one of the living areas of insects and report on the findings to the class.

CONCEPT: Some insects are useful to man: some are harmful.

1. Make a frieze of the life history of some of our useful insects.

2. Show the pollen on flowers. Use the microprojector. Carefully watch bees collecting pollen and nectar. Follow the movements of the bee to observe whether it visits the same kind of flower or goes from one kind to another.

3. Explain the purpose of pollen and the role insects play in spreading it.

4. Bring a honeycomb to class. Examine the structure and the six-sided cells. Permit the children to taste honey.

5. Read and tell how the ladybird beetles help to control scale on orange trees.

6. Assign library research reports to more advanced pupils on little known insects that are, economically or otherwise, significant contributors. A good starting point may include any of the following.

   'Lac' insects for shellac and lacquer.
   Fly larvae which live on decaying animals, for example, bluebottle fly.
   Body secretions of blister beetle and/or larvae of some flies used for medicinal purpose.

7. Suggest report to the class on "ant-cows" (aphids).

CONCEPT: Insects differ from spiders.

1. Bring in a garden spider and any large-type insect in good condition. Compare their number of legs and body segments, the presence or absence of wings, and other obvious structures.

   Can you see how spiders and insects are alike—how they differ.

2. Collect as many different kinds of spiders as can be found. Prepare, mount, and identify. Also indicate where the specimen was found and the date.

3. Develop a class notebook and/or collection on spiders and insects.

4. Report on:

   How the Spider Gets Its Food
   How the Spider Spins Its Web
   How the Spider Grows
   How Spiders Help Us
   How Spiders May Be Harmful

5. Bring in a spider. Put it into a glass jar with a fine screen top and the kind of plants on which the spider was found. Observe methods of capturing and eating food, laying eggs (female), constructing webs and defending itself. Egg sacs will sometimes be found with the web; pupils should be on the alert to bring in eggs when possible.

6. Report on the "orb weavers."

7. Explain why the spider is never caught in its own web.

CONCEPT: Man tries to control the growth of both useful and harmful insects and spiders.

1. Discuss why some insects and spiders are considered dangerous.

2. Recount how some diseases are spread by insects.

3. Discuss in what ways man protects himself from insect pests.

4. Obtain information about chemical agents used to destroy insect pests.

   Do we kill all insects by the same method?
   Why not?

5. Discuss "conservation of natural enemies."

   Do birds play a role here?
   How?
   Do the chemicals used on insects affect the birds?

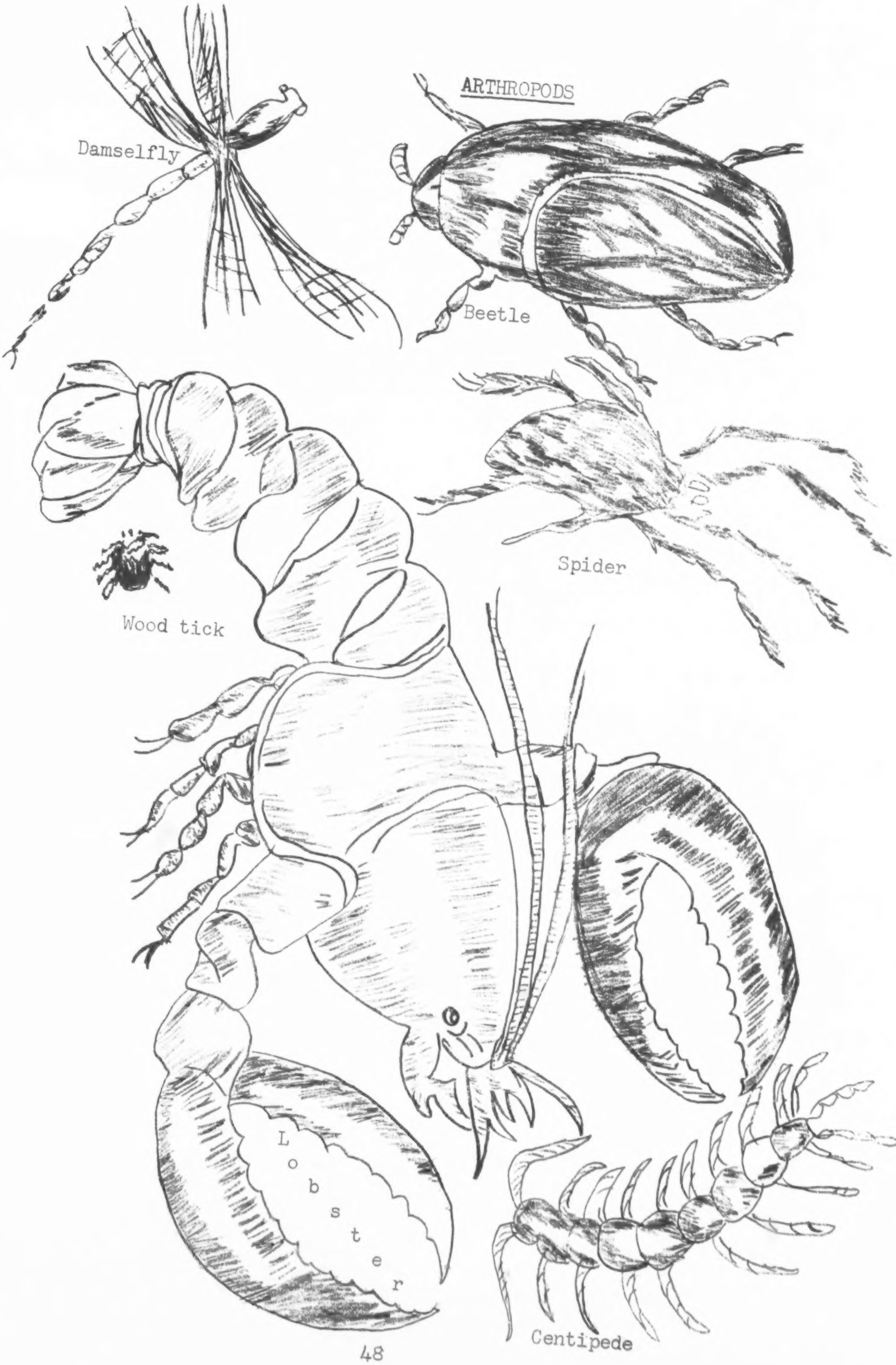
6. Report on the importance of man's ability to adapt to his environment.

CONCEPT: Animals are especially fitted for the environment in which they live.

1. Ask parents, grandparents or neighbors about plants and animals in this area which have slowly disappeared in their lifetime. Include birds, wild and domestic animals, some species of fish, flowers, and wild fruit. Report to the class and try to account for some of these changes.

2. Tell about a trip taken to another state or section of the country such as Florida, New England states, Northwestern states,

ARTHROPODS



prairie states, or Arizona.

Were the plants and animals different from those in this area?

3. Learn how a fish is suited to live in water.

   Do fish use air (oxygen)?
   How do fish move about?
   What do they eat?

4. Have a few pupils read about a desert animal and tell the class how it is adapted to live for days without water.

5. Have the children make up riddles or play games, such as "twenty questions," to keep the characteristics of each group in mind.

6. Discuss dinosaurs.

   Why aren't any still living on earth?

   Discuss their family tree.

7. List some animals presently in danger of becoming extinct.

CONCEPT: Some animals tend to live together in groups and/or packs.

1. Set up an exhibit of animal families. They may be ceramics or stuffed animals. Make dioramas of these family groups with suitable backgrounds.

2. Make a scrapbook of pictures of animal families. Encourage the pupils to contribute to this collection.

3. Select one animal that lives in a group and report on its habits and environment. Encourage the use of library resources.

CONCEPT: Some animals are useful to man.

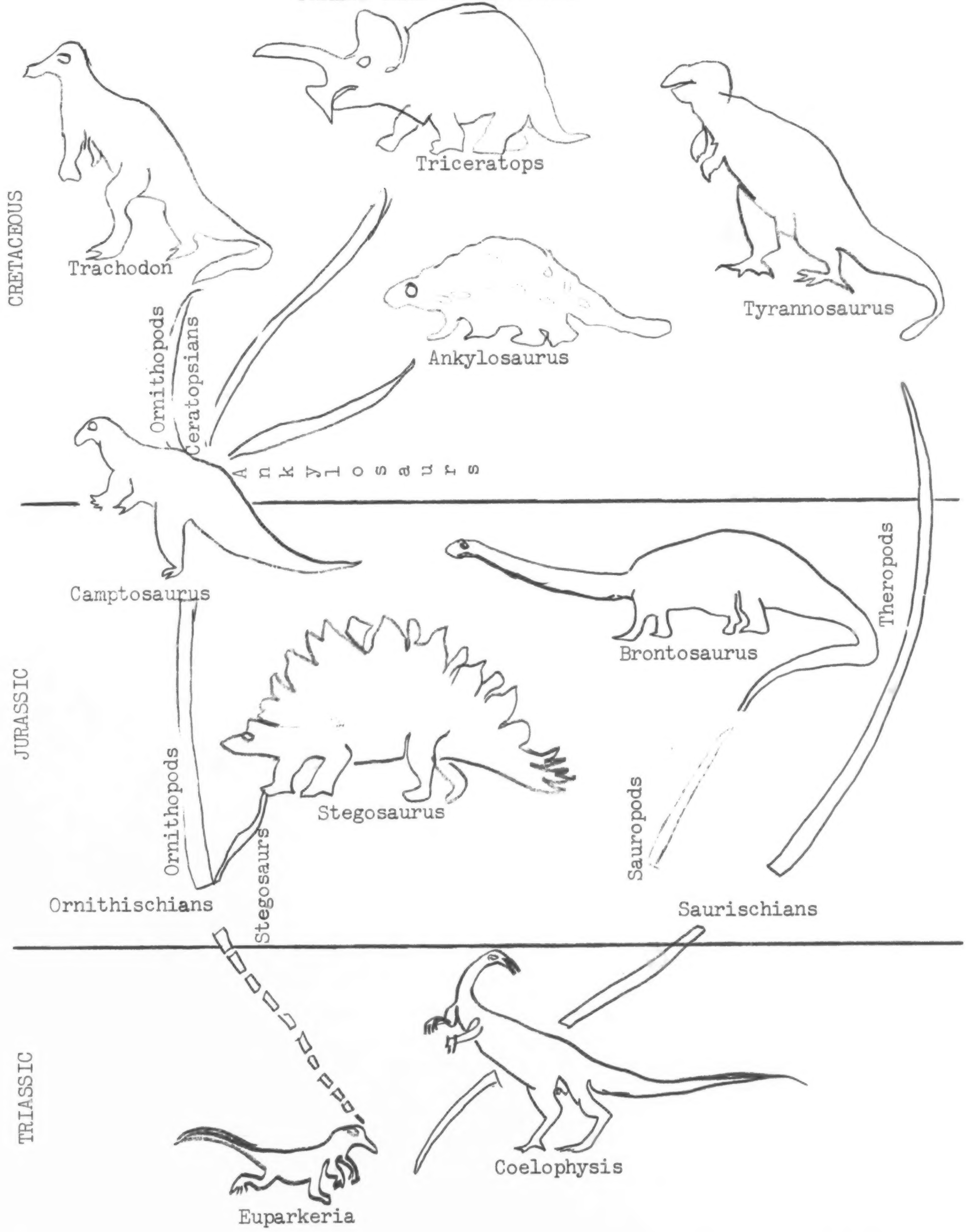
1. Make illustrated charts showing the animals that are used for transportation: the horse, oxen, deer, donkey, dog, mule and camel.

2. Discuss the important part they played in our early history; how they are still useful to man regardless of modern machines which have taken over some of the heavy work formerly done by animals.

3. Make a frieze showing that certain animals are a source of fur (beaver, raccoon, mink, squirrel, muskrat, seal, ermine and fox).

4. Make a frieze showing the usefulness of dogs and cats to man (police dogs, war-service dogs, seeing-eye dogs, sheep dogs, watchdogs, farm dogs, St. Bernard dogs of Switzerland, cats).

FAMILY TREE OF DINOSAURS



5. Make a chart of the products we get from the cow: kinds of food and why they are important in our diet; articles made from hide.

6. Discuss farm animals and their benefits to man.

CONCEPT: Some animals are harmful to man.

1. Plan an exhibit of fruits and vegetables which show animal damage: an apple or ear of corn damaged by the larvae of insects; leaves of tomato plants with aphids; partially eaten greens caused by rabbits.

2. Report about an animal which is harmful in some way.

3. List as many animals as the group can suggest and talk about harmful features of each.

4. Observe and tell about a lawn or garden which is in need of weeding.

   Is a community garden club a good idea?
   Can pupils help around the school area?

5. Display pictures of harmful plants. Point out identifying characteristics so that the pupils will be able to identify the plant and avoid contact.

CONCEPT: Animals differ from each other in structure and function.

1. Review briefly the outstanding differences between plants and animals. Permit pupils to contribute their personal ideas on ways which they use to distinguish these differences.

2. Define the term protist. Explain that scientists are still trying to complete the grouping of plants and animals.

   What is the basis for their differences or problems?

3. Talk about the many different names given to the same animal. Explain why scientists cannot use common names in grouping.

   Does the same animal ever have more than one name?
   If so, how is this possible?

4. Ask pupils to read about the many attempts by scientists to devise a successful system of classification. Include information about the work of Aristotle. Discuss the acceptability of his system.

5. Read about and discuss the contributions of Carolus Linnaeus.

   Why was his system of grouping living things so successful?

6. Define the term classification. Compare the terms classification and grouping.

7. Introduce and define the word zoologist.

8. Compare the grouping of animals with the organization or sections used in department and food stores.

    How are they similar?
    Different?

9. Present a brief overview of invertebrates and vertebrates.

10. Discuss the spinal column, vertebra, and the term "backbone."

    What does the spinal column do?
    Where is man's?
    Can it be felt easily?

    List animals with "backbones" that are used as a source of meat.

11. Bring in an earthworm. Compare it with a plastic model of a fish or chicken skeleton by demonstrating the presence or absence of a spinal column.

12. Write the classification of invertebrates on the chalkboard. Discuss.

13. Stress predominance of insects; remind pupils that spiders are not insects but are a separate group. Review the term arthropod.

14. Talk about the group arthropoda.

    Are insects an important percentage of this group?
    Are most of the animals in the world arthropods?

15. Select one of the lesser known invertebrate groups. Report to the class using any available specimens, illustrations, or drawings.

16. Make a random list of animals and appoint small committees to find out whether the animals are vertebrates or invertebrates. Classify various animals into either of the two groups as shown below:

Animals	Vertebrate	Invertebrate
dog	X	
grasshopper		X

17. Obtain charts, pictures, or models of the skeletal structure of different animals. Note the similarities and differences. Use an opaque projector if available to show them to the class.

18. Prepare illustrations of various types of animal skeletal structures. Label the important parts. Again note similarities and differences (the overhead projector may be used to good advantage in this activity).

19. Compare the five main groups of vertebrates. Note their similarities and differences.

20. Bring in at least two or three colored pictures of animals belonging to each of the groups. Set up an identification system.

    Play the "Twenty Questions" game in trying to clarify pupil thinking.

21. Make an animal album using colored pictures or drawings with short descriptive reports. Classify the illustrations according to group.

22. Construct papier-mâché, pipe cleaner, or wire models of the skeletal structure of a fish. Use other animals also. Compare results and discuss them.

23. Observe the activities of a goldfish or other living fish in an aquarium. Discuss the fins, gills, and scales.

    Do all fish have scales? Explain any variations. If so, name them.

24. Compare a frog with a toad. Identify the differences between them; the similarities. Use live examples if possible.

25. Read about the various types of reptiles. Discuss the physical differences.

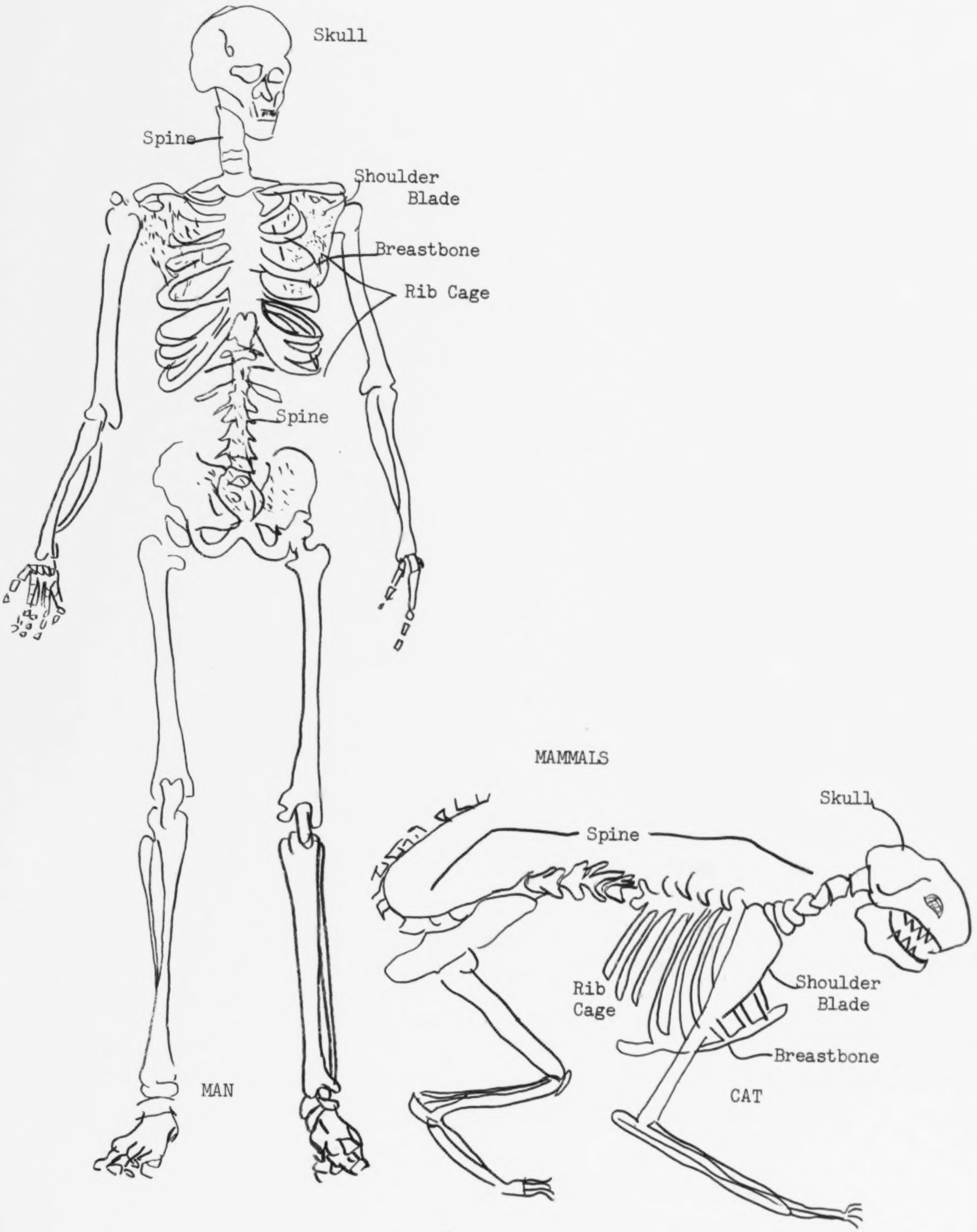
26. Pursue the study of snakes.

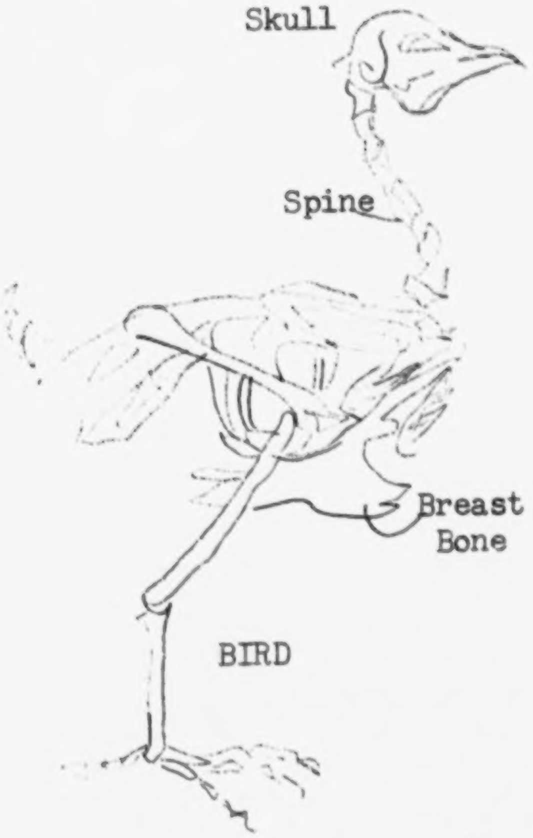
    How do snakes move?
    What common snake bears living young?

27. List the characteristics common to turtles.

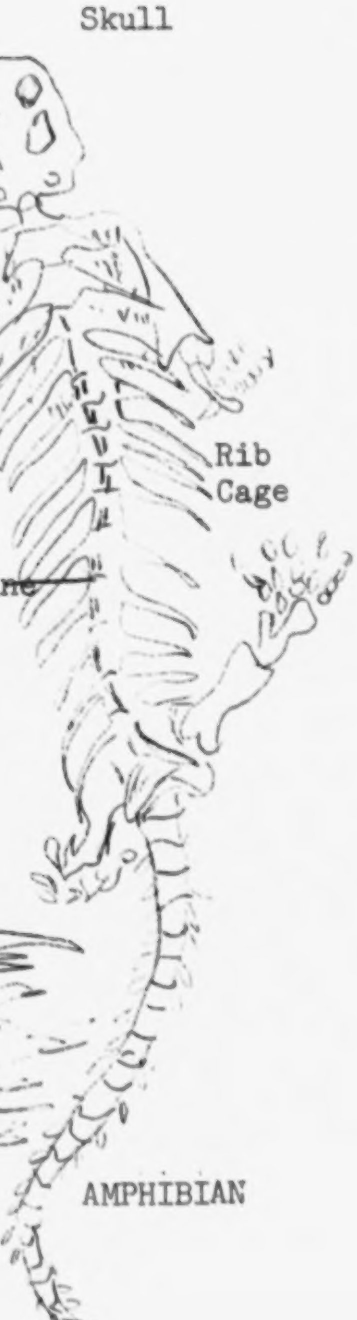
    Does a turtle have a spinal column?
    If so, where? Describe it.

28. Conduct research on the differences between alligators and crocodiles. Permit the pupils time to present their findings to the class.

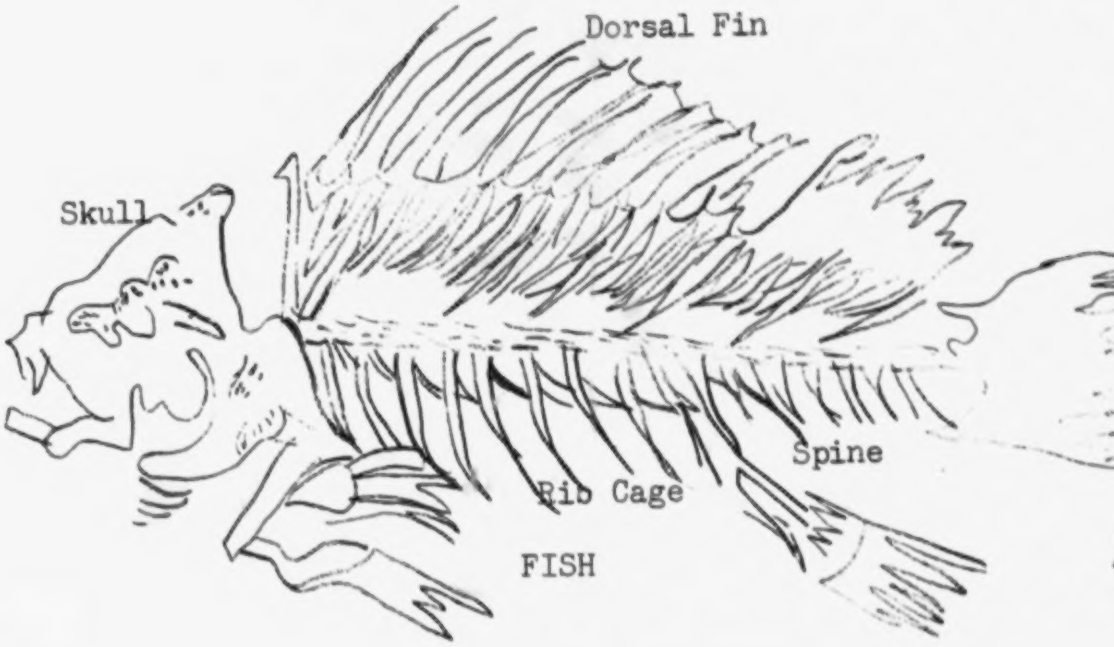

Skull
Spine
Shoulder Blade
Breastbone
Rib Cage
Spine
MAN
MAMMALS
Skull
Spine
Rib Cage
Shoulder Blade
Breastbone
CAT



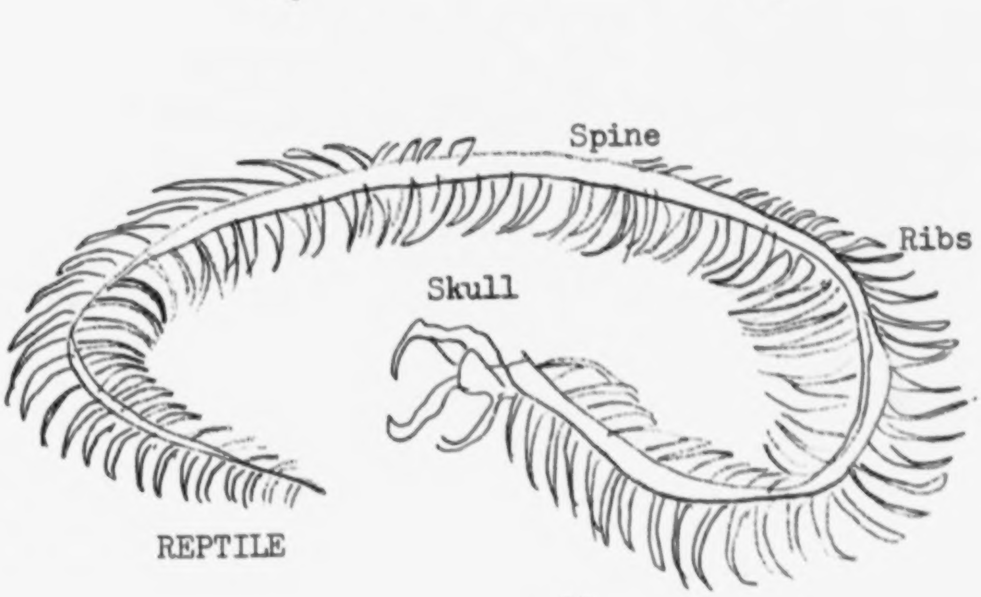
BIRD



AMPHIBIAN



FISH



REPTILE

29. Talk about the different kinds of birds that have been seen.

    How can they be distinguished from one another?
    What things do all birds have in common which are used in grouping?

30. Read about, observe, and discuss some of the differences in mammals as contrasted with the other groups. List the characteristics that are used to identify mammals. Include the human beings.

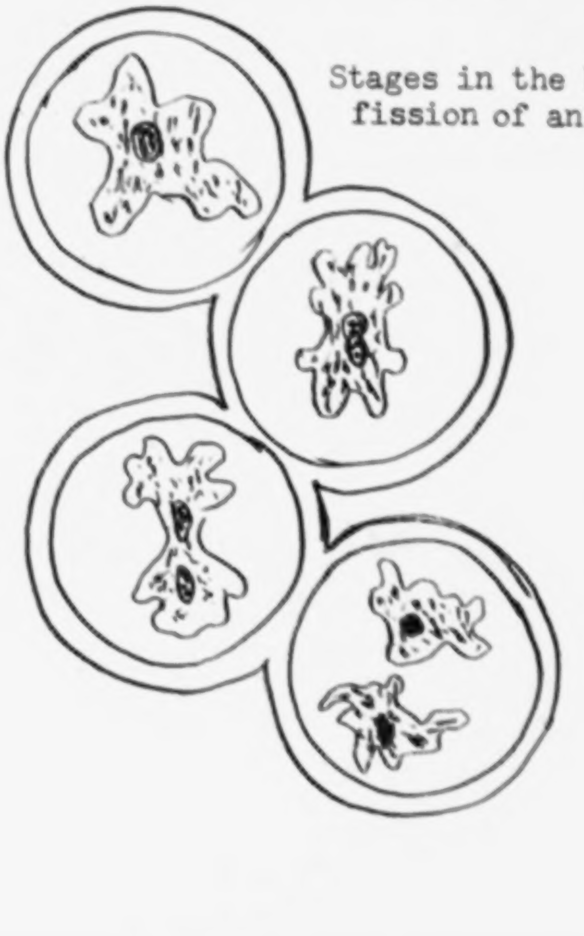
31. Construct a chart showing the skeletal structure of an animal. Make an electric answer game out of this chart.

32. Reconstruct the skeletal structure of a chicken or other fowl. Soak the bones in hot, soapy water for a half hour or more to remove meat. Use household cement and wire or string to reassemble the fowl's skeletal structure. (The bones must be thoroughly clean and dry before attempting this project.)

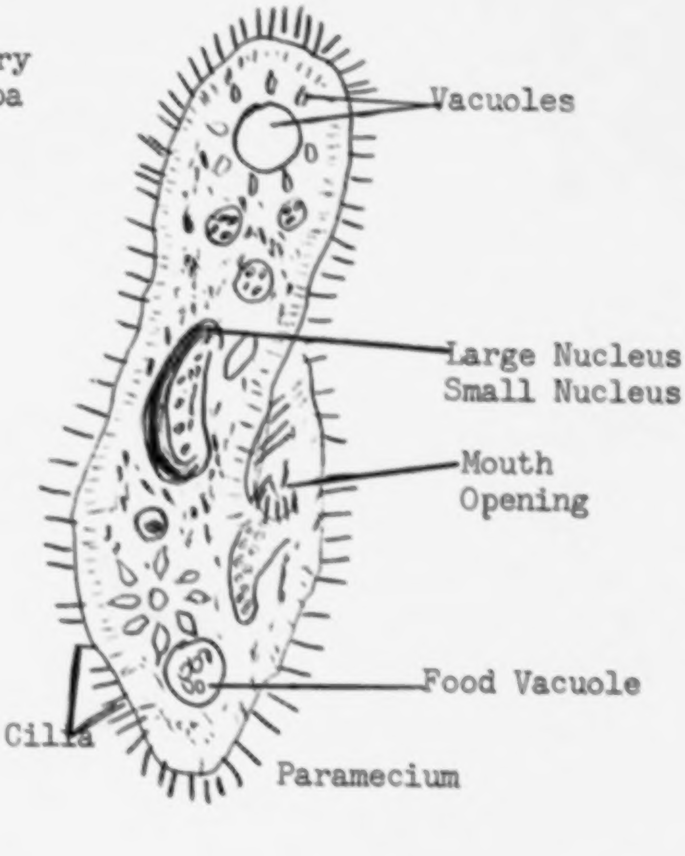
CONCEPT: Animals reproduce similar offspring (species).

1. Place a handful of hay in a jar of distilled or aged water and keep the jar in a warm dark place for several days. Obtain a microscope or microprojector slide of the scum formed in the jar. Look for one-celled animals on slides; paramecia and other organisms may be seen. Possibly reproduction by means of cell division (binary fission) may also be seen.

2. Obtain or make simple illustrations showing dividing in such one-celled animals as the paramecium and amoeba.



Stages in the binary fission of an Ameba



Paramecium

3. Bring coral to class and examine its physical structure under magnification. Describe the many kinds of organisms found in the coral. Allow pupils to handle and study it at length.

4. Report on jellyfish and sponges.

   How do these organisms reproduce?

5. Define the term regeneration. Read about the lobster, crayfish, and earthworm in relation to this aspect.

6. Report on recent experiments with the regenerative capabilities of planaria. Encourage them to make simple drawings for the class presentation.

   Suggest that a science project may result with additional study.

7. Introduce and define the terms egg, sperm, and embryo. Develop a simple working definition for each. Ask pupils to place them into their science notebooks.

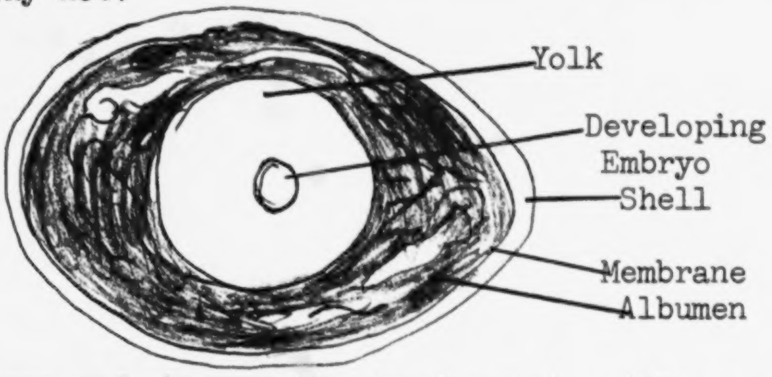
8. Carefully break the yolk of any fresh hen's egg. A white spot on the egg yolk may be visible. This is the part of the egg that would have grown into a chicken, if fertilized.

   By means of charts or illustrations explain the development of an egg.

   Will an egg purchased in a store produce a chick? If not, why not?

FERTILE

EGG



9. Obtain frog eggs and observe the development. Allow several weeks for this activity.

10. Fashion different types of eggs out of clay, papier-mâché, or plaster of paris.

11. Try to duplicate the actual size. Color them as they are in nature. Display them. (Illustrations of various types of eggs may be found in books. Seek information on an independent study basis.)

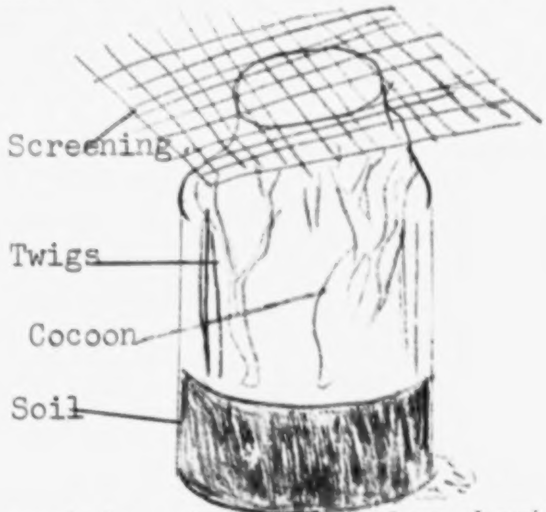
12. Summarize the major differences in animal eggs. Include a brief talk about the animals which retain fertilized eggs (embryos) until living offspring are born.

13. Raise guppies in the classroom. Observe the dark area within the female until a living guppie is born. (Guppies are excellent for this purpose because they are almost transparent and reproduce quickly).

    Why must the young be removed from the tank and the mother after birth?

14. Obtain some mealworms. Place them in a jar (screw top, holes punched in top) with oatmeal, parakeet seeds, or bran flakes, and a piece of peelings for moisture. Keep them in a dark place and in a short time they should hatch into adult beetles.

15. Obtain a cocoon and observe the emergence of the adult insect. Place an inch or more of damp soil on the bottom of a large glass jar or aquarium, and lay the cocoon on the soil. Keep the container covered with a piece of screening. Be sure to sprinkle the cocoon and the soil with a little water once a week.



16. Place some lean meat in a jar containing about an inch of soil. Catch several live flies and place them in the jar. Cover the jar after having punched several small holes in the lid. If enough adult flies are available, the pupils may be able to see the larva, the pupa, and the adult fly stages. Illustrate the stages of development of a fly.

17. Set up a display of animal pictures. Divide it into two groups: baby animals who resemble their parents and baby animals who do not resemble their parents. For example, developing toads, frogs, and butterflies do not look like their parents. The young of mammals look very much like their parents in almost every way except that they are smaller; this is true of reptiles also.

CONCEPT: Oxygen is required by all living things; but it is taken into the organism in different ways.

1. Show how oxygen is needed by living things. Light a candle and place it upright on a dish or plate. Place a jar over the candle. The candle will soon be extinguished because it will "use up" the oxygen contained in the jar. Compare the candle to an animal who, if unable to obtain oxygen, would soon die.

2. Recall experiments which dealt with the observation of living insects.

   Why should several small holes be punched in the lid of the insect container?

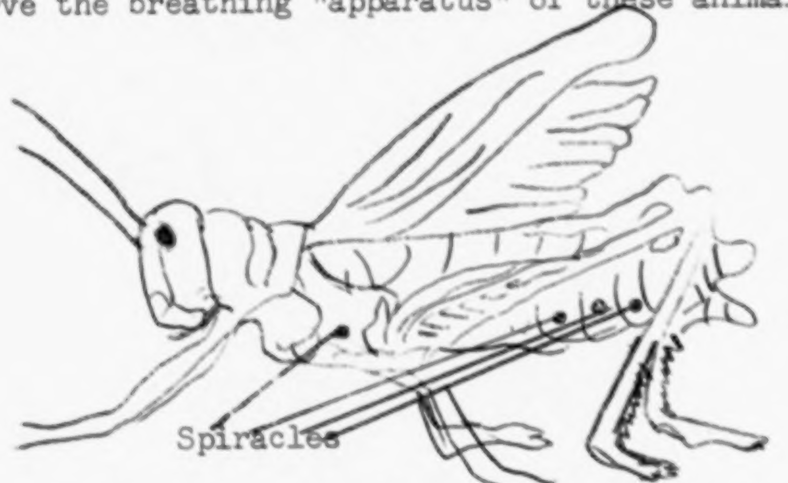
3. Discuss and list ways invertebrates obtain oxygen.

4. Study the specialized breathing mechanisms of the following:

   Crayfish
   Grasshopper
   Starfish

5. Obtain grasshoppers or other insects. Using detailed illustrations as a guide and using a magnifying glass, see if study groups can observe the breathing "apparatus" of these animals.

GRASSHOPPER



6. Obtain a live frog. Study it with reference to the frog's method of breathing (observe frog's throat as it moves up and down).

7. Find out how fish breathe under water.

   Why is oxygen so important to living things?

CONCEPT: Birds can be identified according to their body characteristics.

1. Show pictures of various kinds of birds and discuss with the pupils the feathers which all birds have in common.

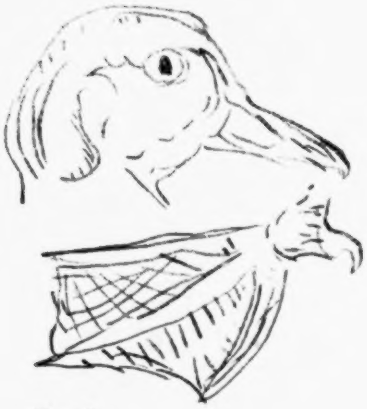
   Can all birds fly?

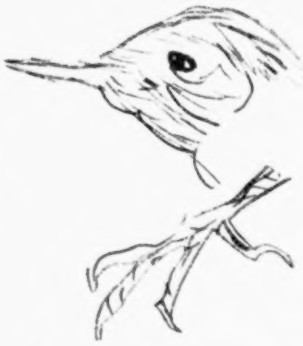
2. Select several birds of different environments and make a chart to compare their characteristics.

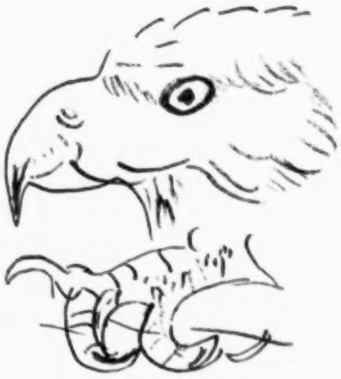
3. Collect and display pictures of familiar birds of the Gary region.

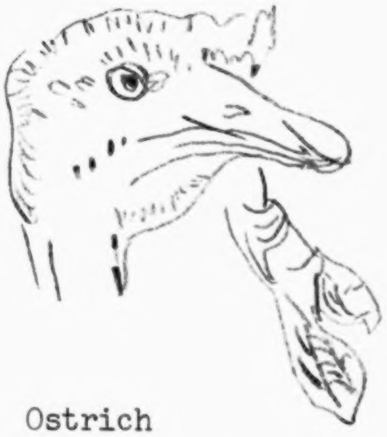
4. Use bird pictures as flash cards to assist in bird recognition.

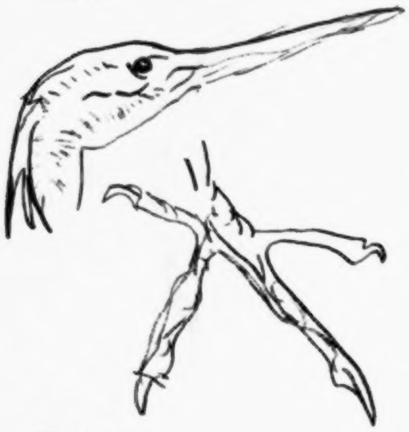
5. Cut out outlines of various birds using light wood or heavy

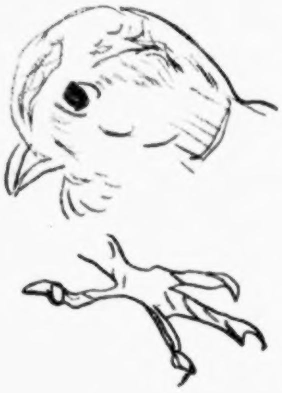

Duck

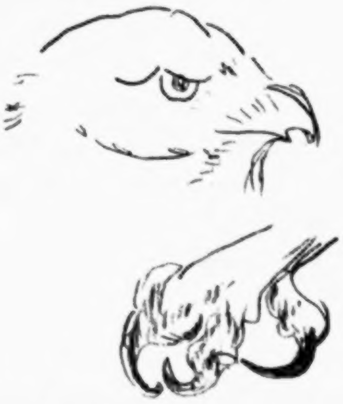

Wren

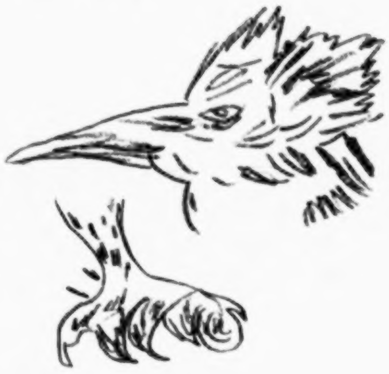

Eagle

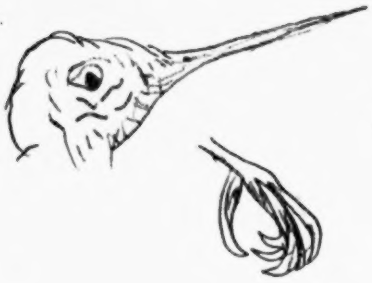

Ostrich

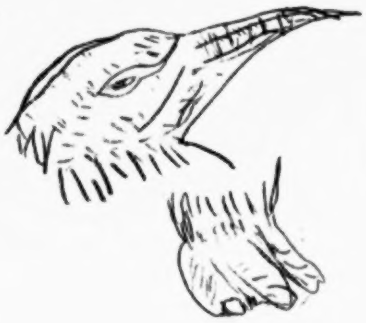

Heron

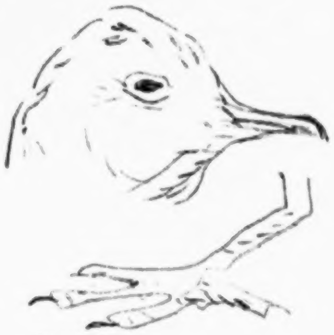

Sparrow

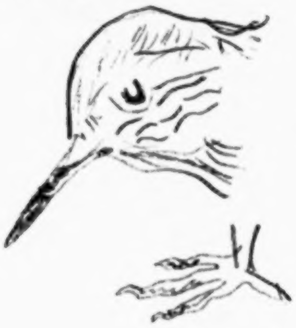

Hawk

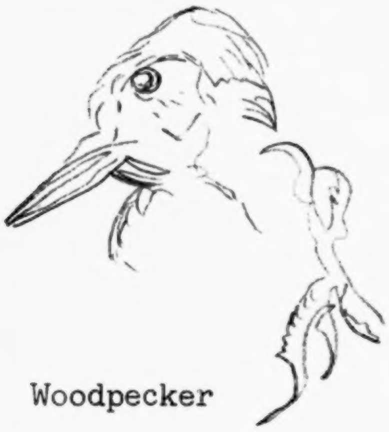

Kingfisher


Hummingbird


Penguin


Robin

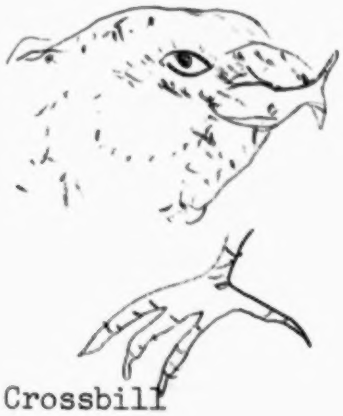

Sandpiper


Woodpecker

BIRD BILLS

and

FEET


Crossbill

cardboard. Color them and attach dowel rods or small sticks. Use as ornaments in potted plants or window boxes.

6. Listen to records of bird calls and songs. Use 2 in. x 2 in. slides or show a picture of the birds as his song is heard. Learn to identify some of the birds by their calls.

7. Report on the eye structure of several birds, such as the owl, the robin, and the eagle.

8. Carefully study a mounted bird. Note the following:

   color of the feathers
   feet adapted for scratching, wading, clinging to small branches, or tearing flesh
   purpose the bill or beak serves
   size

9. Compare the bills of the woodpeckers, sparrows, ducks, geese, flamingos, eagles, and other birds to determine how each kind of bill is fitted to the work it has to do.

10. Make enlarged drawings of bird bills. Be sure to indicate the specific purpose of each type of bill. Glue or paste enlarged drawings of bird bills on cardboard. Cut them out. Fasten the upper and lower portions of the bills with a paper fastener so that the bill action can be simulated.

11. Report on the adaptations of birds' feet to their environment, such as grasping, climbing, perching, swimming, scratching, with examples of each.

12. Make plaster of paris casts of bird tracks. Be sure to label each cast. Notice the similarities and differences.

13. Assemble plastic models of birds. Paint and label them. Some of the models available are the robin, scarlet tanager, parrot, and bluebird.

14. Prepare a bulletin board to display different kinds of feathers. Label them.

15. Observe feathers by using the microprojector and/or microscopes.

16. Demonstrate the effect of preening. Crumple two pieces of paper of equal size. Place one inside a piece of newspaper that has been oiled and the other inside a piece of plain newspaper. Place in separate dishes. Sprinkle both with water. Remove outer coverings of newspapers. Observe and compare. Explain why preening is important.

17. Collect pictures of male and female birds of the same species and note the similarities and differences.

    Are there special advantages in their color differences?

18. Read and/or discuss the nesting habits of birds. Examples follow:

    the chimney-swift builds its nest of twigs on the inside wall of a chimney or silo.
    the cowbird lays its eggs in the nests of other birds.
    the kingfisher digs a tunnel in a dune and make a nest out of fish bones

19. Fashion a bird's nest out of modeling clay and straw or excelsior.

20. Develop reports on unusual birds, such as nightingale, albatross, shrike, flamingo, whistling swan, penguin, whooping crane, and humming bird.

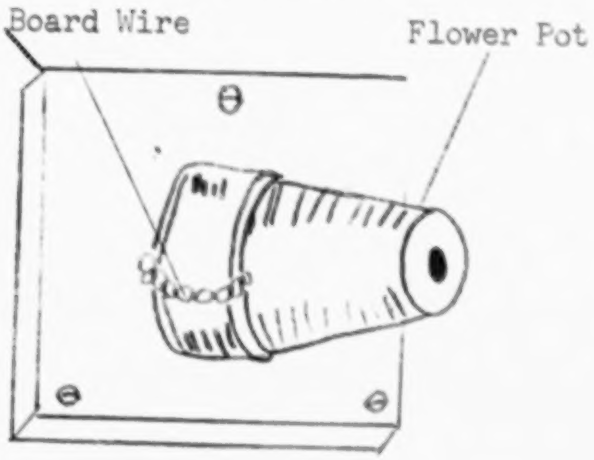
21. Display pictures of eggs of various birds. Compare color, size.

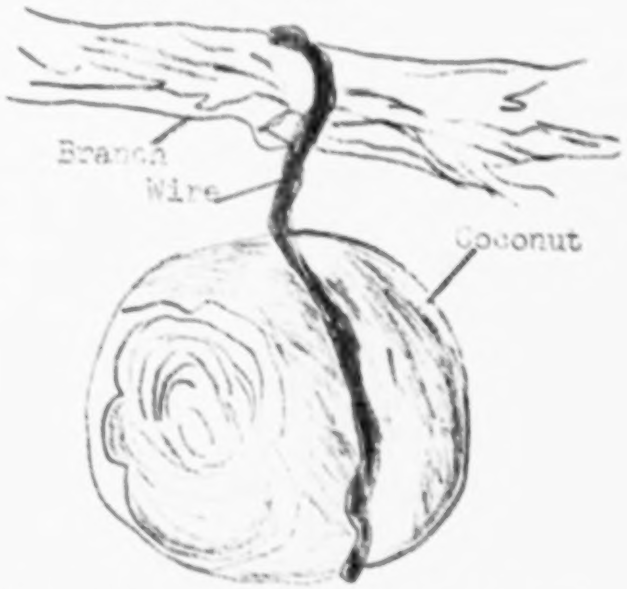
22. Select a committee to construct a bird-feeding station and place it outside the classroom. Observe the kinds of birds who visit the feeding station. Keep daily records of the bird "guests." Be sure to keep the feeding station well-stocked with food. This project could also be done on an individual basis at home.

23. Photograph the birds who visit the feeding station. An experimental study of what different birds eat can be initiated by placing different types of bird food (seeds, bread, suet, insects, small pieces of meat and fish, grain) on the feeding station. Determine which birds eat each type of food.

Construct a simple bird house.

24. Construct a feeding station from a coconut.


SIMPLE BIRD HOUSE


FEEDING STATION

26. Make a chart showing the principle parts of a typical bird found in the community.

27. Collect photographs of various types of birds in flight. Paste them on cardboard and cut them out. Suspend them from vantage points in the classroom. Variation: Use child-drawn bird pictures.

28. Discuss preening of feathers in relation to flight.

29. Compare the relationship of body structure to flight.

30. Report on extinct birds and probable reasons for their extinction; possibility of disappearance of the condor and whooping crane.

31. Draw paths of migrations of birds on an outline map of the western hemisphere.

32. Study the movements and activities of the hummingbird and report to the class.

33. Have the pupils keep a record of the return of birds to the Gary area after fall migration. Report on species found in the community.

34. Discuss the difference between innate and learned behavior patterns in regard to migration, nest building, and flock formation.

CONCEPT: Most birds are useful to man.

1. Suggest that the pupils join the Audubon Junior Club. For information write to the Audubon Junior Clubs, 1000 Fifth Avenue, New York, New York, 10028.

2. Write to the National Audubon Society (above address) for a list of its publications.

3. Write to the National Wildlife Federation, Servicing Division, 20 Spruce Street, Boston, Massachusetts 02108, for a list of leaflets relating to the conservation of birds.

4. Write to the United States Government Printing Office, Washington, D. C., for a copy of "Some Common Birds Useful to the Farmer." Price 15¢.

5. Assign reports on the importance of the so-called scavenger birds (vulture, buzzard).

6. Find out what kind of insects different species of birds eat (for example, the cuckoo eats tent caterpillars).

7. Report on our most useful birds and why they are so categorized.

8. Discuss: A bird eats his own weight in insects every day.

9. Make a large chalkboard sketch of a bird and an airplane. Discuss their similarities.

10. Appoint a committee to find out what laws Indiana has for protecting game and song birds.

11. Report on the purpose, methods, and results of birdbanding. If possible, obtain sample bands to accompany the report.

CONCEPT: Some birds are harmful to man.

1. Assign reports:

   Some Birds Are Helpful to Man.
   Some Birds Are Harmful to Man.

2. Tell that the English sparrow and the starling were brought to the United States from Europe.

   Why are these birds now considered a nuisance?

3. Report on various birds of prey.

CONCEPT: Some animals survive unfavorable environmental conditions through migration, hibernation, change of coat, or change of living habits.

1. Discuss the term migration.

2. List and discuss some of the theories set forth to explain why some birds migrate.

3. Set up committees to watch for flocking and travel.

4. Assign a committee to find other animals that migrate. Report to the class.

5. Discuss the term hibernation.

6. Prepare a list of animals who hibernate.

   What preparations do these animals make for hibernation?

7. Bring pictures to show various ways in which animals are protected against cold weather.

8. Demonstrate hibernation. Use an aquarium and build a mound of soil in which a small cave can be hollowed out. Have a pond at one end. Use wire screening at the top. Place a frog in the "cave." Put ice cubes in the pond water and some cubes on the top of the "hill." Observe the frog's actions. Remove ice; observe.

9. Discuss: Some animals put on "winter coats" and are able to survive unfavorable environmental conditions.

10. Discuss: Some animals change their living habits and survive unfavorable environmental conditions.

BIRDS OF THE GARY AREA

BIRDS	ARRIVAL	DEPARTURE
Baltimore oriole	May	August
Barn swallow	April	August
Belted kingfisher	April	October
Bobolink	May	September
Brown thrasher	April	September
Catbird	May	September
Chimney swift	May	September
Common nighthawk	May	September
Eastern bluebird	March	October
Eastern kingbird	May	August
Eastern meadowlark	March	October
Eastern phoebe	March	October
House wren	April	September
Kildeer	March	October
Mourning dove	March	October
Purple martin	April	September
Red-headed woodpecker	April	October
Red-winged blackbird	March	October
Robin	March	October
Rose-breated grosbeak	May	September
Ruby-throated hummingbird	May	September
Scarlet tanager	May	September
Song sparrow	March	October
Spotted-sandpiper	May	September
Towhee	March	October
Yellow-bellied sapsucker	April	September
Yellow-shafted flicker	March	November

11. Make a chart with the class:

Animal's Name	Habitat	Adaptation to Changes of Climate

12. Make a study or a report of some wild animal living nearby. (Rabbits and squirrels are quite common in the Gary area. The following questions about this animal should be answered.

    Where does it live?
    Is it active during the day, night, or both?
    Does it hibernate in the winter?
    Who are its enemies?
    What is the animal's methods of locomotion?
    How is the home built?
    Is food stored for the winter?

13. Prepare a mural depicting the ways in which some animals survive difficult conditions.

14. Become thoroughly familiar with an animal of their own choosing which has survived because it has adapted to its environment by hibernating, migration, or changing its coat.

15. Compare the migrating and hibernating bats as to habitat, food intake, factors contributing to their differences and similarities.

16. Discuss likely reasons why the dinosaurs were unable to adjust to changes in their environment.

CONCEPT: The body temperature of warm-blooded animals is generally not influenced by the conditions of the immediate environment.

1. Discuss the term warm-blooded.

2. Recall classification of vertebrate animals and identification of warm-blooded ones.

3. Display pictures of warm-blooded animals.

4. Discuss how warm-blooded animals are able to survive unfavorable environmental conditions. Prepare a check list of animals as shown below

Animal	Migration	Hibernation	Change of Coat	Change of Living Habits
Weasel			X	
Canadian Goose	X			
Brown Bat		X		

5. Use the chart as a reference; collect and mount pictures or photographs of warm-blooded animals. Categorize the animals in groups as shown on preceding page.

CONCEPT: The body temperature of cold-blooded animals is affected by changes in air temperature.

1. Prepare a chart dividing animals into two basic categories: cold-blooded and warm-blooded animals.

Warm-Blooded	Cold-Blooded
dog	snake
cow	turtle
lion	frog
tiger	lizard

2. Show that changes in air temperature affect the body temperature of cold-blooded animals. Use a glass jar with a metal screw top which has several small holes and one large center hole. Into the latter insert a thermometer. Use cotton to hold the thermometer snugly in place. Obtain two or more flies. Place the flies in the jar and screw on the top. Place the jar into a bowl of ice.

What happens to the flies as the temperature decreases?

(The flies are less active as the temperature drops.)

Remove the jar from the bowl of ice.

What happens to the flies?

(The activity of the flies will increase as the temperature rises.)

Grasshoppers or other insects can be used.

3. Show how cold-blooded animals survive unfavorable environmental conditions. Prepare a check list of animals as shown below.

Animal	Migration	Hibernation	Change of Living Habits
Monarch Butterfly	X		
Turtle		X	X
Snake		X	X

4. Use the above chart as a reference; collect and mount pictures or photographs of cold-blooded animals. Categorize the animals in groups as shown above.

5. Obtain a turtle, toad, or garter snake. Keep it indoors in a

suitable cage. Be sure that there is some earth on the bottom of the cage. Place the cage in a cool location. Observe the behavior of the animal. Place the cage in a warm place and observe further.

What is the difference in the activity level of the animal?

6. Observe goldfish at those times when a particular room's temperature is low.

   Is there a change in their level of activity?

CONCEPT: Animals can be improved through selection and hybridization.

1. Use three pieces of paper entitled "Brahman Cattle of India," "Native Texas Cattle," and "Selective Breed." Label five pieces of paper as indicated below:

   resistance to insects
   resistance to disease
   resistance to heat
   resistance to drought
   fine meat qualities.

   The first four qualities apply to the Brahman Cattle and should be placed on the paper entitled "Brahman Cattle of India." The last trait should be placed on the paper entitled "Native Texas Cattle." Explain that the above change actually has taken place.

BRAHMAN CATTLE OF INDIA
Resistance to insects
Resistance to disease
Resistance to heat
Resistance to drought

PLUS

NATIVE TEXAS CATTLE

Fine meat qualities

EQUALS

SELECTIVE BREED
Resistance to insects
Resistance to disease
Resistance to heat
Resistance to drought
Fine meat qualities

2. Collect pictures or make original illustrations of animals that human beings have changed through cross-breeding. Display them.

3. Select some pupils to write to the 4H Club for booklets on the selection and breeding of animals.

4. Write to the U.S. Department of Agriculture or the State Department of Agriculture for material on hybridization and selective breeding.

5. Gather facts about the mule and report to the class.

6. Discuss the selective breeding necessary to produce a dairy breed and a beef breed.

7. Discuss the possibilities of other true hybrids besides the mule. Cite examples.

CONCEPT: A program of conservation can help to improve changing environmental conditions and prevent the needless loss of wildlife.

1. Discuss the terms conservation and wildlife.

2. Locate information in regard to extinct birds. Find information on the extinction of the passenger pigeon, great auk and the red-crested ivory-billed woodpecker.

3. Find information about the formation of the American Bison Society in 1907.

4. Select committees to report to the class on the Lacey Act of 1900, the McLean Migratory Bird Treaty of 1916, and the similar treaty between the United States and Mexico in 1936.

5. Collect material on fur-farming; for example, mink or chinchilla farms.

6. Discuss the importance of maintaining a balance in nature.

   What has been the result of killing so-called harmful animals?

   (Bobcat and deer situation in government forests.)

   Are predators necessary?

7. Construct a chart to show the ways in which animal life has decreased and some of the measures provided to alleviate the situation.

8. Discuss the establishment of Yellowstone National Park as a reserve for protection of wildlife.

   Are there other sanctuaries or refuges?

9. Discuss the National Park Service and the Fish and Wildlife Service Bureaus (Department of Interior).

10. Read and report about the conservation of fish.

11. Discuss the specific conservation methods used in Indiana.

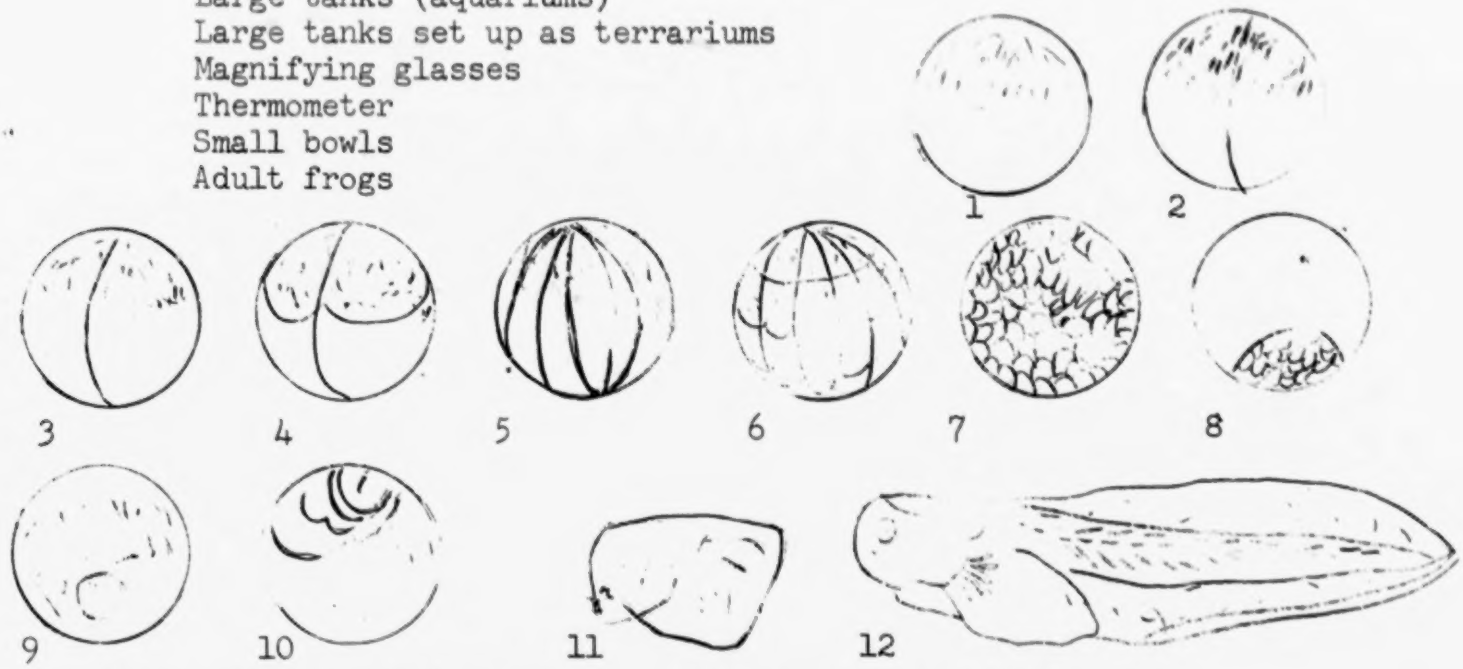
12. Discuss the contributions of Theodore Roosevelt to the conservation program.

13. Ask some pupils to find the purpose and activities of the World Wildlife Fund.

CONCEPT: Young frogs (tadpoles) change into adult frogs by a process called metamorphosis. Metamorphosis occurs in all amphibians.

1. Materials needed:

    Masses of frog eggs (obtained from ponds, streams, or purchased from a biological supply house)
    Large tanks (aquariums)
    Large tanks set up as terrariums
    Magnifying glasses
    Thermometer
    Small bowls
    Adult frogs



Stages in the development of a frog egg into a tadpole. The time required for this development to take place depends on the species and the water temperature.

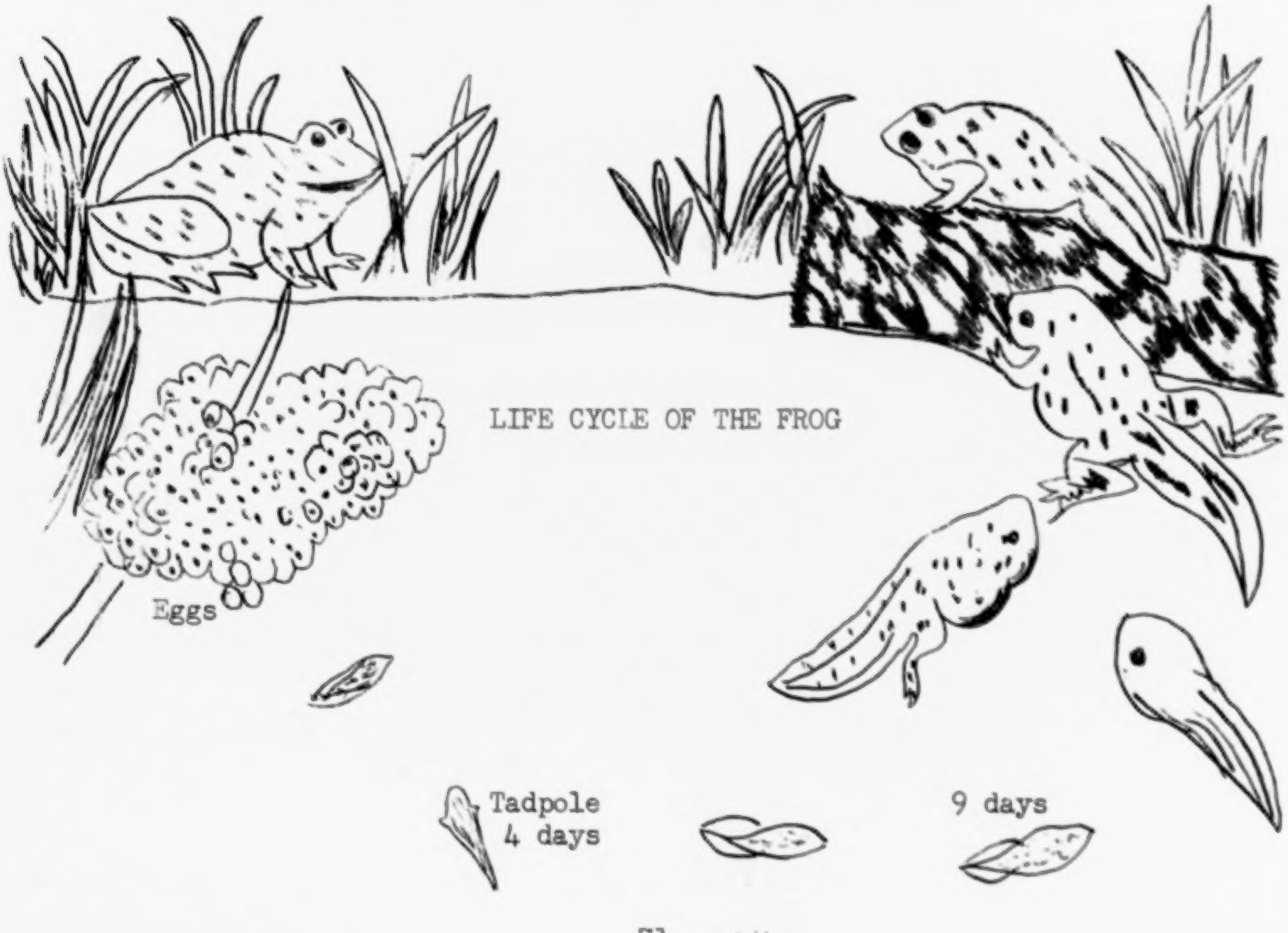
Place small masses of eggs in the small bowls, and let the children examine them with magnifying glasses. Ask them what the dark spot on the top of the egg appears to be. (The developing tadpole. Any eggs without a dark spot toward the top are not fertile; they should be cut out with a pair of scissors and thrown away.) Ask the children if they know what purpose the jellylike substance serves. (To keep the eggs stuck together, to keep them afloat, and probably also to provide them with some nourishment.) Can the children see the yellow area just under the dark spot? Do they know what it is? (The yolk sac attached to the belly of the tadpole.)

Explain that the yolk contains food and is similar to the yolk of a chicken egg.

Keep the eggs in the large tanks filled with water. Every few days let the children examine them. They should be able to see changes occurring in the eggs as the young tadpoles begin to develop. If the water of the tank is kept at about 60°F. to 65°F., the eggs will hatch sooner than if the water is cooler. Normally, hatching should take anywhere from eight days to a few weeks.

When the eggs finally hatch, have the children examine and describe the tadpoles. (Streamlined, fishlike body, no legs, long tail, gills in the neck region, beaklike mouth, dark brown or black body, etc.) Display the adult frogs and ask the children what changes the tadpoles will have to undergo in order to become adult frogs. (Lose the tail, grow hind legs and forelegs, change color, lose gills, which changes to lungs for breathing, etc.) Tell the children that these changes occur as part of a process called metamorphosis, and explain that all amphibians undergo metamorphosis. (Another familiar amphibian is the salamander.)

Ask the class to identify the yellow pouch attached to the tadpole's stomach. (The yolk sac.) Ask them if the tadpoles will need food right away. (No, because they have not used up the entire supply in the yolk sacs.) Tell the class that the tadpoles should be able to live for another few days without needing additional food. Encourage the children to



suggest what tadpoles usually eat. (Algae and other tiny plants in the water.) Transfer the tadpoles to an aquarium containing green plants.

Ask the class how the feeding habits of frogs differ from those of tadpoles. (Tadpoles eat tiny aquatic plants; frogs feed on insects and other small animals.) To demonstrate what frogs eat, let some flies loose in the terrarium and watch the frogs go after them. Explain to the class that the frogs will attack only things that move. They can prove this by putting some dead flies in the tank. (The frogs will not eat them.) The children can also try dangling a piece of paper or fabric at the end of a string and jiggling it up and down in the tank. (The frogs will go after it.)

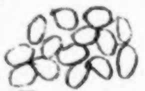
In the case of the common leopard frog (Rana pipiens), the time it takes for a tadpole to become an adult frog is about three months. If the tadpoles begin to sprout leg buds, place them in combination land-water tanks where they can climb out of the water on to a rock or some earth.

Results/Conclusions: Tadpoles hatch from frog eggs. Young frogs are called tadpoles . Tadpoles do not have the same characteristics as adult frogs. They do not look the same, and they do not eat the same foods. The process by which a tadpole develops into an adult frog is called metamorphosis. Metamorphosis occurs in all amphibians.

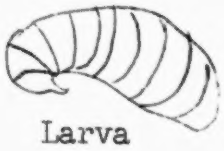
CONCEPT: Ants are social insects; they form colonies. Each member of the colony performs a specific task that helps the colony survive.

1. Materials needed:

   Ants
   Food (grains, vegetables, and scraps from the children's lunches)
   Ant home
   Black construction paper
   Red cellophane
   Dirt
   Collecting bottle
   Sheets of cardboard



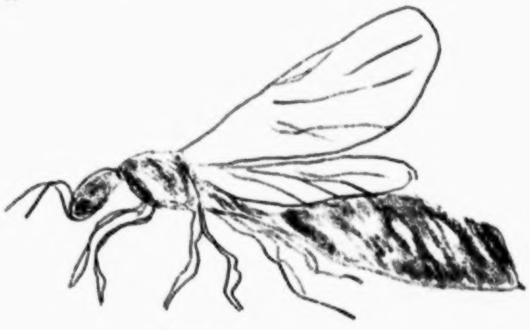
Eggs



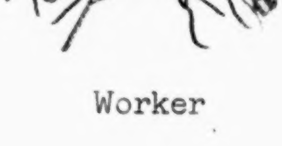
Larva

Pupa

Male



Queen



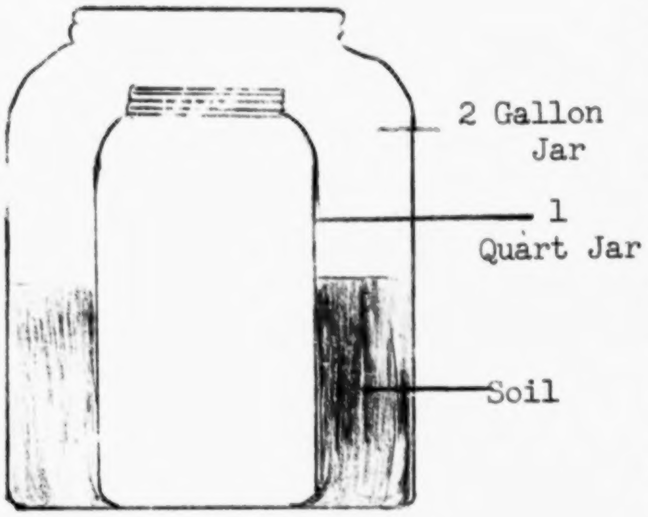
Worker

The children can find an anthill close to school and observe how the ants live in their natural habitat. One child can disturb the anthill so that the activities of the insects can be seen. Worker ants will carry the eggs and pupae to safety and scurry for protection. Suggest that the children note the site of this ant nest and come back to it later. Ask them to keep in mind the confused condition of the colony, in order to compare its state when the class returns.

Ask the children how they might study ant life in the classroom. They will guess that they need a specialized terrarium called an ant home. The children may make either of the two ant farms suggested below. No matter which they choose, they must consider several factors. First, the major part of a colony lives below ground; therefore, the children will need a deep container. Second, ants tend to shy away from light; therefore, the children will have to devise a method of blocking out light. Third, ants need food and moisture. The children can experiment in class to find how much moisture and what types of food the ants prefer.

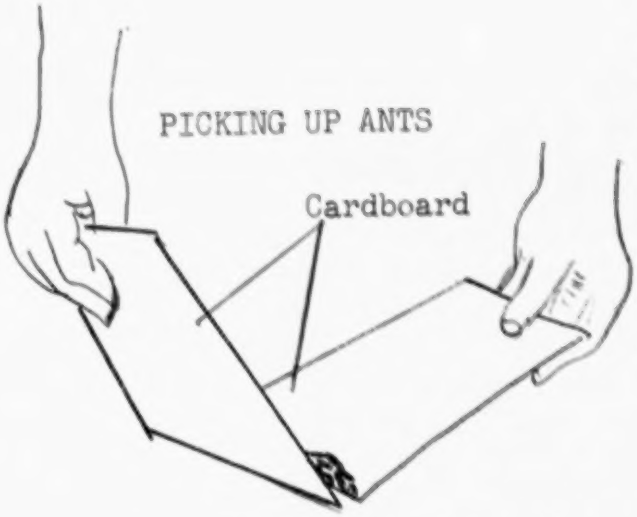
The simplest kind of ant home consists of a large jar. Restaurants buy their food in mass quantities and often have 2-gallon jars which they may give to students. The children may insert a capped 1-quart milk or fruit juice jar into the larger jar. In addition, to help insure that the ants build their chambers and tunnels along the sides of the jar where the students can see them, have the children wrap some black construction paper around the outside of the jar to block light. Keep this paper on, except when the children wish to observe the ants. It is not necessary to cap the large jar. The ants will not escape if the jar is set in water.

SIMPLE ANT HOME



The second type of ant home is more difficult to build, but more rewarding because there is increased surface for observation. This ant home is described in the illustration.

Have the children tape a piece of red cellophane over one sheet of glass. They should then tape black construction paper over both sheets. When the children lift the black paper for observations, have them compare the reactions of the ants on the clear side with the reactions of the ants on the side covered with red cellophane. (Red cellophane will block out much of the light, so the ant



will not move away as quickly as on the clear side.) The completed ant home should be set in a shallow pan of water.

The children may now fill either their jar or framed ant home ½ full with sandy soil. They should also fill another jar with a cap about ¼ full. This capped jar will be used to transport the ants back to class.

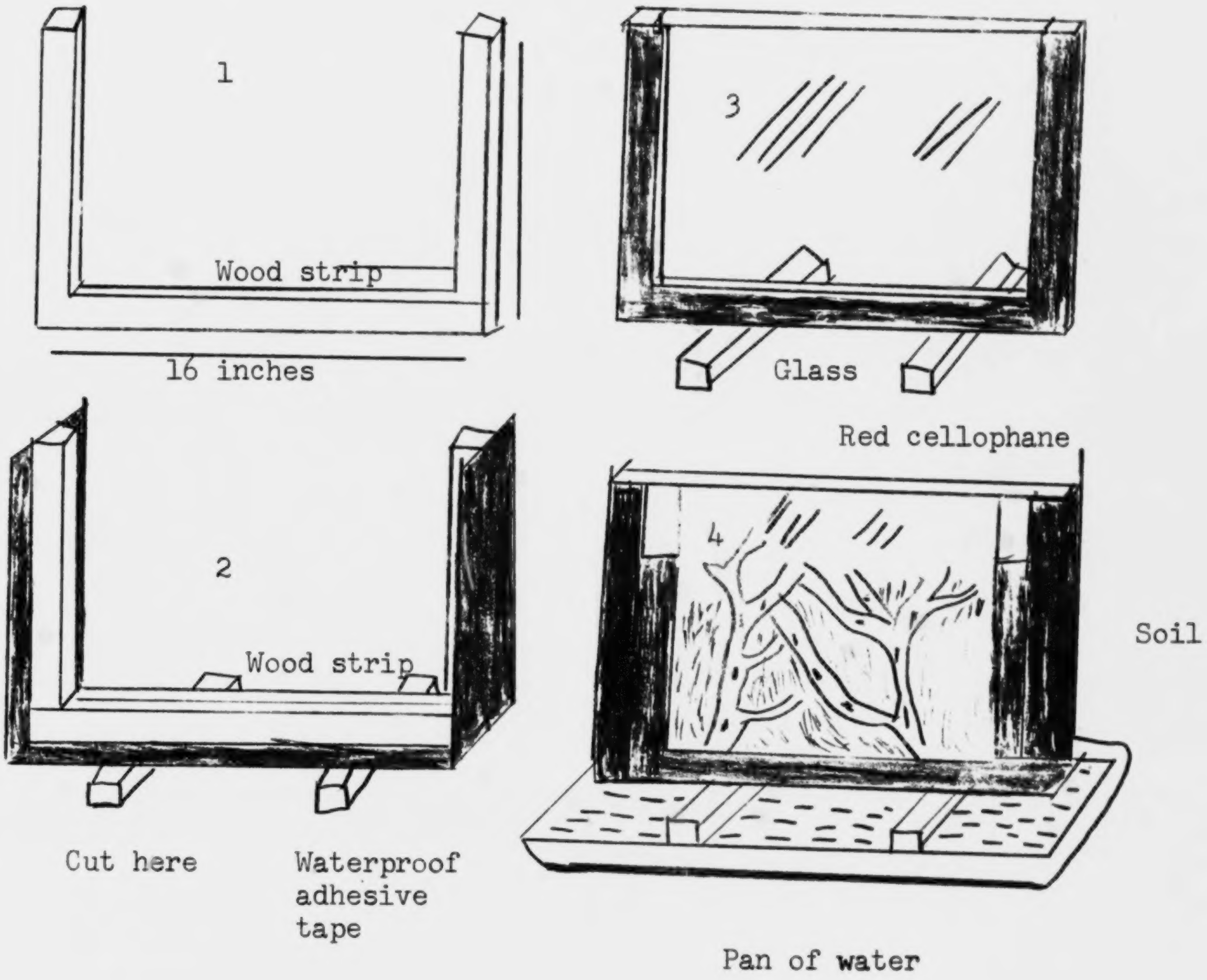
The children should revisit the site where they found the anthill. Have them notice how the nest has been reconstructed. (If the nest was continually disturbed by curious children, the ants may have sought a new home.) One child may then prepare to dig down into the nest, while the other children stand ready with pieces of cardboard to scoop up the ants. Have the child with shovel insert it as deeply as possible and bring up a large spadeful of dirt. The children should scoop up workers, larvae (legless grubs resembling semitransparent white rice grains), and pupae (yellowish, resembling grains of wheat). Using a hand lens the children may try to find eggs. Stress that a queen must be found, if the colony is to continue. Have the children look for a queen from 6 to 8 inches below the surface of the ground. A queen may be distinguished by her larger size. Her abdomen may be quite swollen by eggs and its plates separated. The children should gently transfer their ants into the collecting jar. Do not throw or pack dirt in, as the pressure may kill the ants. When the children have found from fifty to one hundred ants and a queen, they are ready to return to class.

Carefully transfer the ants and dirt from the nest into the ant home, which should be set in indirect sunlight. The children should keep the nest moist by sprinkling the top with water every other day. They may put different kinds of food, including vegetables, cornflakes, pieces of meat, scraps from their lunches, etc., on top of the soil to see which kinds the ants prefer. Have the children notice how the workers approach the food. The workers will feel it with their antennae, which they use to "smell." If it is acceptable, the worker will hoist it over her back, even if it is many times her size. Rejected food should be removed by the children from the surface so that it will not rot and spoil the nest.

The children can daily check the progress of their ant colony. As soon as their observations are made, they should re-cover the home with black paper. The children should particularly notice how members of the colony cooperate. The queen lays eggs. Various workers keep the chambers clean; others tend the eggs, larvae, and pupae; others go out for food; and still others defend the nest. All work for the well-being of the colony.

MAKING AN ANT HOME

Cut a 3/4 by 3/4 inch strip of wood into 2 pieces 11¼ inches long, 1 piece 16 inches long, and 2 pieces 6 inches long. Form a frame by nailing as shown. Place a piece of waterproof adhesive tape on the table, adhesive side up. Place the frame on the adhesive and fold up the sides of the tape. Cut each corner on each side. Nail on the two 6 inch strips that will serve as the base. Set a sheet of glass 12 by 16 inches in size on each side of the frame and hold each sheet in place with the tape. Add the soil and set the frame in a pan of water to prevent the ants from escaping.

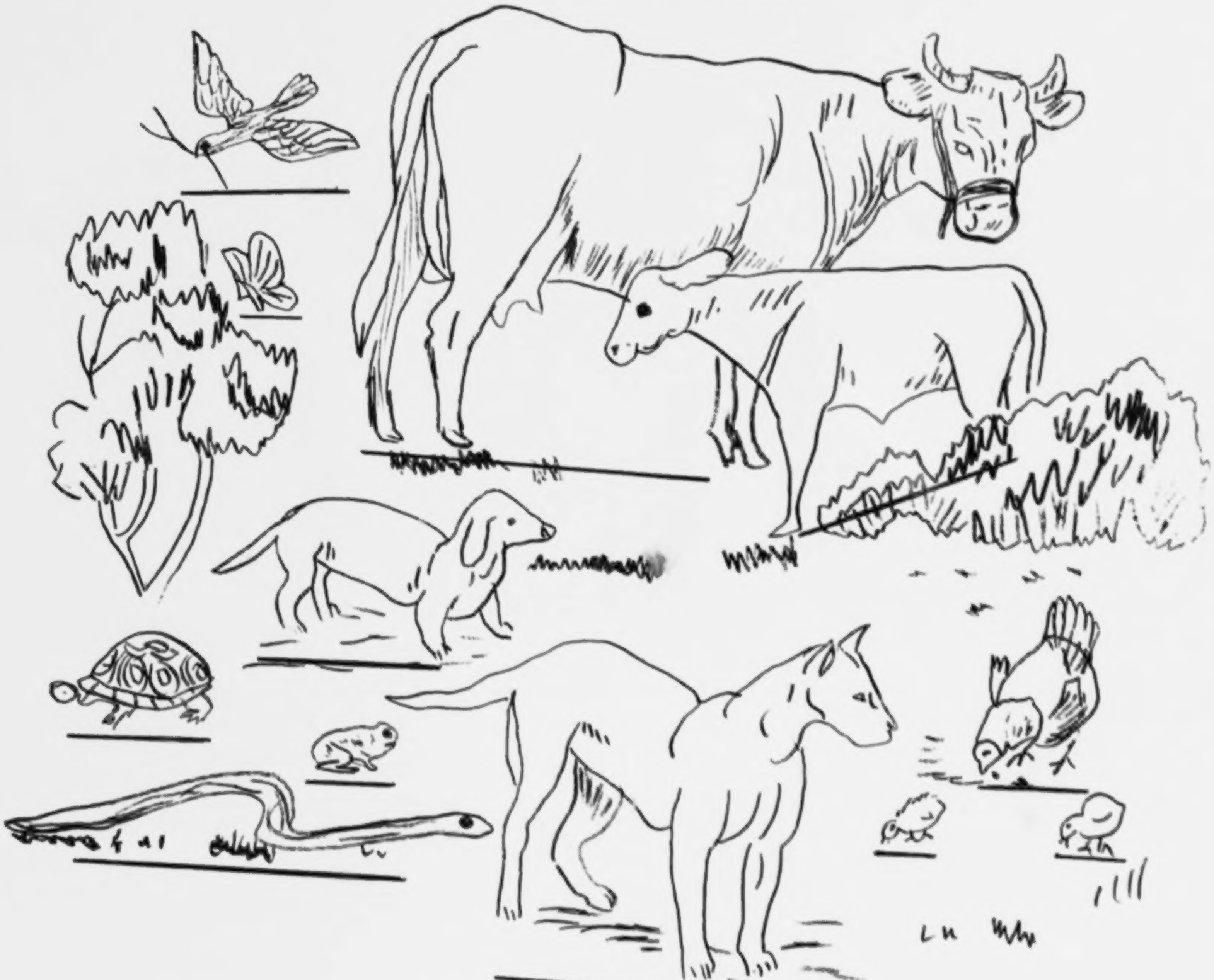


The children may keep a record of the ants' progress in tunnel building by laying a sheet of clear plastic over the glass and tracing the tunnels and chambers. Each day's progress could be traced in a different colored grease pencil. For example tunnels observed on Monday could be marked in green, and any new tunnels that appear by Tuesday could be marked in blue. This plastic sheet may be pinned on white paper on the bulletin board for continued comparison and reference.

Results/conclusions. Ants are social insects; they live in colonies. Each member of the colony performs a specific task that helps the colony survive.

EVALUATION

Included here are samples of evaluation items which could be used in developing your informal testing program. These suggested types of items cover the particular science area that has been developed in this section of the handbook. This also means they could be used to help develop informal testing to cover large areas of information (monthly, mid-year, end-of-year testing). These are no means complete tests as such. You will adapt and develop items to meet your particular class's own idividual needs and differences.



DRAW A LINE UNDER EACH ANIMAL.

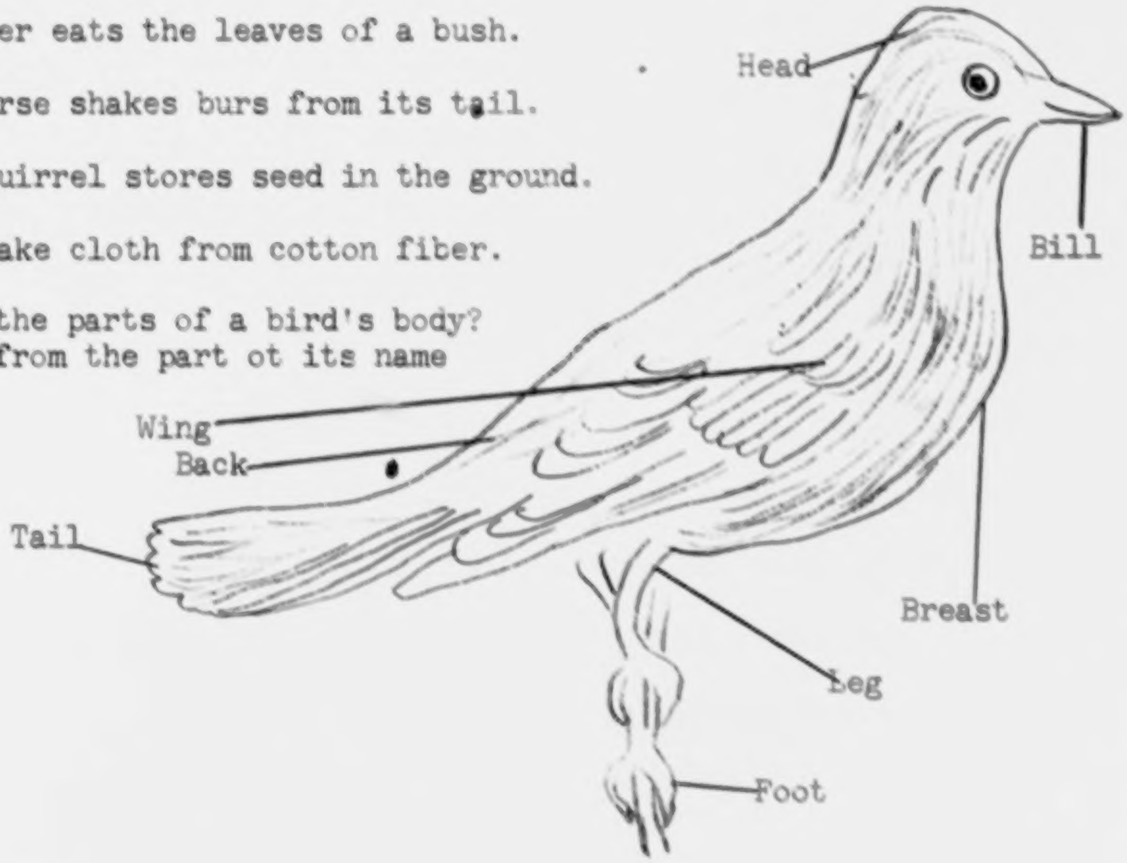
B. Draw a line under the answer that belongs in the blank.

1. All insects are __________. [✓ animals] butterflies
2. An insect has __________ legs. [✓ six] eight
3. Many insects have ________. hands [✓ wings]
4. An insect has _________ feelers. [✓ two] four
5. An insect has ______ parts to its body. two [✓ three]
6. These are → legs [✓ feelers]
7. These are → [✓ legs] feelers

C. Put a ✓ before each sentence that tells about a way in which plants help animals. Put an ✗ before each sentence that tells about ways in which animals help plants.

✓ 1. A robin builds a nest in an oak tree.
✓ 2. A squirrel eats an acorn.
X 3. Burs stick to a dog's hair and are carried away.
✓ 4. A cow rests in the shade of a tree on a hot, sunny day.
✓ 5. A deer eats the leaves of a bush.
✓ 6. A horse shakes burs from its tail.
X 7. A squirrel stores seed in the ground.
✓ 8. We make cloth from cotton fiber.

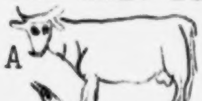
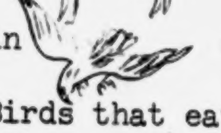
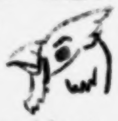
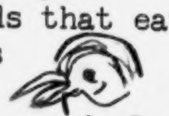
D. Do you know the parts of a bird's body?
Draw a line from the part ot its name



E. Draw a line under the right answer.

1. There are many kinds of birds. [✓ Yes] No
2. Some birds fly away when winter comes. [✓ Yes] No
3. Most mother birds have bright colors. Yes [✓ No]
4. Birds help us when they eat insects. [✓ Yes] No
5. All birds have the same kind of bills. Yes [✓ No]
6. Many birds sing pretty songs [✓ Yes] No
7. Birds are covered with feathers. [✓ Yes] No
8. Birds have one wing and three legs. Yes [✓ No]

F. Draw a line under the answer that belongs in the blank.

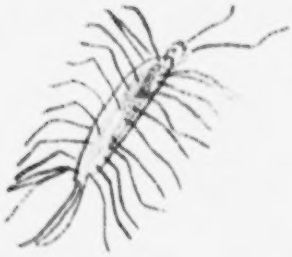
1. All animals must have ________. grass [✓ food]
2. Many animals use their eyes, noses, ears, and __________ to get food. [✓ teeth] feathers
3. An animal's _________ can help you find out what food it eats. [✓ nose] teeth
4. A  eats _______. [✓ plants] animals
5. An  eats _______. plants [✓ animals]
6. Birds that eat _______ have bills like this  [✓ seeds] insects
7. Birds that eat _____have bills like this  seeds [✓ insects]

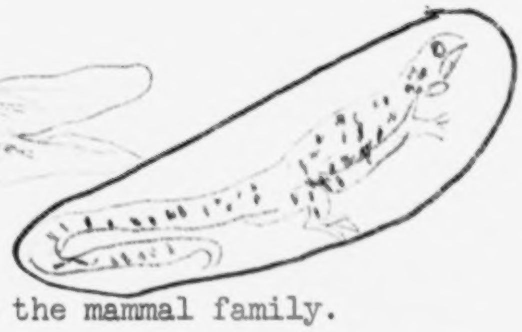
G. Write the word plants or animals on each blank.

1. Make their own food. PLANTS
2. Give us linen and cotton cloth. PLANTS
3. Can see, hear, smell, taste, and feel. ANIMALS
4. Have roots, stems, and leaves. PLANTS
5. Cannot move from one place to another. PLANTS

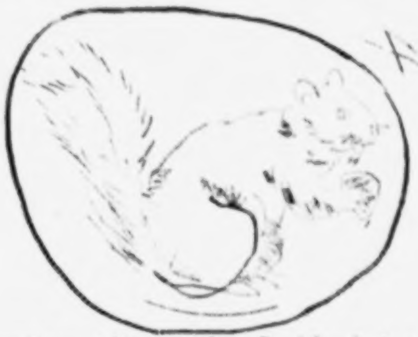
H.

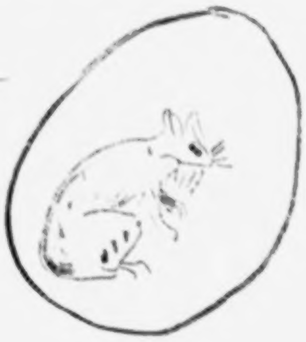
1. Draw a ring around the animal that belongs to the reptile family.





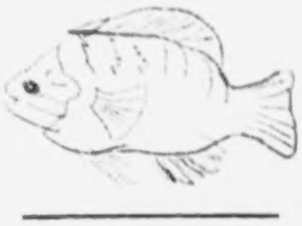
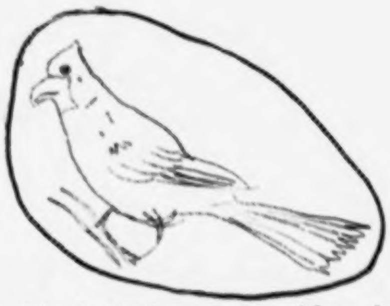
2. Draw rings around the two animals that belong to the mammal family.



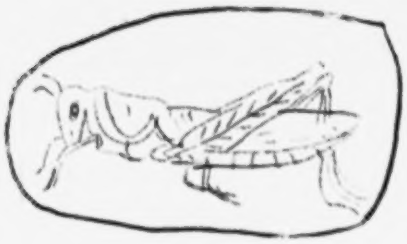


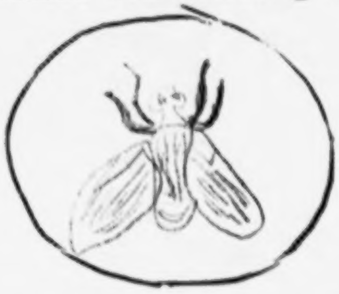
3. Draw a line under the animal that belongs to the fish family.

Draw a ring around the animal that belongs to the bird family.

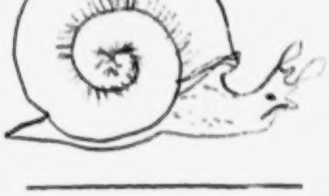
4. Draw rings around the two animals that belong to the insect family.

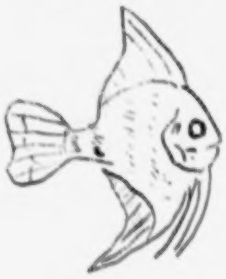
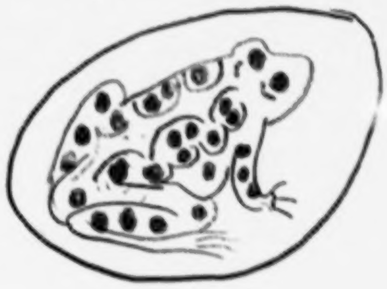




5. Draw a line under the animal that belongs to the mollusk family.

Draw a ring around the animal that belongs to the Amphibia family.



I. Draw one line under the name of any animal that is fitted to live in cold, snowy places. Draw two lines under the names of any animal that is fitted to live in hot, dry deserts. Draw a ring around the name of any animal that is fitted to live in forests.

[✓ camel] [✓ chipmunk] [✓ polar bear] [✓ lizard]

[✓ penguin] [✓ deer] [✓ squirrel] [✓ seal]

J. Complete each of these sentences by drawing a line under the word that belongs on the blank.

1. Animals live together to hunt for _____ more easily.
   enemies workers [✓ food] danger
2. _____ live all their lives in a large group called a colony.
   bison reptiles elephants [✓ termites]
3. The _____ bee lays all the eggs in the colony.
   [✓ queen] drone soldier worker
4. Deer are better able to protect themselves by traveling in large _____.
   schools [✓ herds] colonies flocks
5. _____ work together to build dams and make homes.
   seals [✓ beavers] geese wolves

K. Draw a line under the correct answer.

1. A good habitat for one kind of animal may not be a good habitat for another kind of animal. [✓ Yes] No
2. The mole makes its home under water. Yes [✓ No]
3. Not many water animals build homes. [✓ Yes] No
4. Sticklebacks are a kind of fish. [✓ Yes] No
5. Beavers spend part of the time on land and part in water. [✓ Yes] No

L. For each definition in Column A, find the word it defines in Column B. Number the words the same as its definition.

A.

1. group of animals or plants having certain characteristics in common
2. kind of weather a place has
3. all of the surrounding conditions that affect a living thing

B

4 habitat

1 species

5 adaptation

4. place where an animal or plant naturally lives 3 environment

5. change in structure to fit different conditions 2 climate

M. For each kind of environment in Column A, find the name of the animal in Column B that might live in that environment. Number each animal the same as its environment.

A	B
1. water	5 monkey
2. desert	6 arctic wolf
3. temperate forest	4 bison
4. grassland	1 whale
5. tropical rain forest	3 bear
6. tundra	2 camel

N. For each young animal listed in Column A, find the name of its adult form in Column B. Number the adult form the same as the young animal.

A	B
1. caterpillar	4 grasshopper
2. tadpole	3 dog
3. puppy	1 butterfly
4. nymph	2 frog

O. Complete each sentence by drawing a line under the correct word or phrase that belongs in the blank space.

1. Larva is another name for a moth________.
   pupa adult chrysalis [✓ caterpillar]

2. When certain body changes take place, an insect _______ splits open and the adult crawls out.
   pupa larva [✓ chrysalis] caterpillar

3. The ________ stage of a butterfly is called a chrysalis.
   [✓ pupa] adult larva caterpillar

4. All the changes that a living thing goes through from the time its life begins until it is full grown is called the ________.
   exoskeleton cocoon [✓ life cycle] amphibian stage

5. The offspring of ________ are born alive.
   tadpoles [✓ mammals] amphibia insects

P. Number these stages of animal growth in the correct order.

1. 3 pupa 2 caterpillar 1 egg 4 moth
2. 2 tadpole 1 egg 3 frog
3. 1 egg ___ grasshopper 2 nymph

Q. After each animal listed below, tell whether it is an amphibian, a mammal, or a mollusk.

1. anteater MAMMAL
2. octopus MOLLUSK
3. porcupine MAMMAL
4. armadillo MAMMAL
5. kangaroo MAMMAL
6. mud puppy AMPHIBIAN
7. bat MAMMAL
8. sloth MAMMAL
9. duckbill platypus MAMMAL
10. whale MAMMAL

R. After each animal listed below, tell whether the animal is a vertebrate or an invertebrate.

1. hagfish VERTEBRATE
2. robin VERTEBRATE
3. amoeba INVERTEBRATE
4. alligator VERTEBRATE
5. jellyfish INVERTEBRATE
6. earthworm INVERTEBRATE
7. tick INVERTEBRATE
8. euglena INVERTEBRATE
9. snail INVERTEBRATE
10. paramecium INVERTEBRATE

S. For each group of vertebrates in Column A, find the name of the animal in Column B that belongs to that group. Number the animal the same as the group to which it belongs.

A

1. Fishes
2. Elasmobranches
3. Amphibia
4. Birds
5. Reptiles
6. Mammals
7. Cyclostomes

B

7 lamprey
5 lizard
6 armadillo
2 shark
3 salamander
1 salmon
4 ostrich

T. In column A you will find the names of some pests. In column B you will find the names of some things that may be harmed by these pests. On the blank by the side of each name in column B, write the name of a pest listed in column A that may harm it.

A

clothes moths
silverfish
boll weevils
cockroaches
Rocky Mountain woodticks
gypsy moths
termites
carpet beetles
cutworms
army worms

B	
people	Rocky Mountain woodticks
garden vegetables	cutworms
woolen cloth	clothes moths
cotton	boll weevils
trees	gypsy moths
food	cockroaches
grain crops	army worms
books	silverfish
rugs	carpet beetles
wood	termites

U. Complete each of these sentences by drawing a line under the correct word or phrase that belongs in the blank space.

a. Animals that eat plants directly are called ________ animals.
carnivorus herbivorous amphibious omnivorous

b. Birds which eat seeds have ________ bills.
long and sharp broad and flat short and strong
curved and pointed

c. Animals which feed their young on milk are called ________.
reptiles birds mammals amphibians

d. All foods except salt are made by ________.
green plants mammals insects fishes

e. ________ animals usually have claws for catching their prey.
Carnivorous Herbivorous Amphibians Omnivorous

f. A frog uses its ________ to catch food.
teeth claws tongue poison

V. Write the number of each word group in column A in the space before the item in column B that it best matches.

A

1. Have fins, gills are cold-blooded
2. Have scales, lungs, are cold-blooded
3. Have feathers, lungs, are warm-blooded
4. Have hair, nurse their young, are warm-blooded
5. Have gills first, then lungs, are cold-blooded

B

5 a. Amphibians
3 b. Birds
__ c. Protozoa
2 d. Reptiles
__ e. Worms
4 f. Mammals
1 g. Fishes

W. A list of terms is given below. Select the term from the list that goes with each statement. Write the term in the space before the statement.

Alga Vertebrates Protozoan Protoplasm
Invertebrate Sponge Cellulose

1. VERTEBRATE - animal with a backbone
2. INVERTEBRATE - animal without a backbone
3. PROTOPLASM - a basic living substance
4. PROTOZOAN - one-celled animal

X. Write the number of the word group in column A in the space before the items in column B that it best matches.

A

1. Lays eggs

B

4 a. Honeybee

2. Legs are attached here

3. Supports the body

4. A social insect

5. A sweet liquid

3 b. Skeleton
__ c. Male grasshopper
5 d. Nectar
1 e. Queen bee
__ f. Abdomen
2 g. Thorax

Y. A list of terms is given below. Select the term from the list that goes with each statement. Write the term in the space before the statement.

Abdomen
Nymph
Larva
Thorax
Head
Antenna
Ovipositor

1. Thorax - middle body part of an insect
2. Nymph - stage between the egg and the adult grasshopper
3. Abdomen - the third body part of an insect
4. Larva - caterpillar
5. Head - the first body part of an insect

Z. Complete the following sentences:

1. An insect which cuts or chews its food is the grasshopper.
2. An insect which sucks its food is the moth or butterfly.
3. The muscles that drive an insect's wings are attached to the thorax.
4. An insect's main sense organs are the antennae (feelers).
5. The part of an insect's body in which food is digested is the abdomen.

A. Write a brief but complete answer to each of the following:

1. Why do insects outnumber any other group of animals?
They are able to adapt successfully to many varied conditions. They lay great numbers of eggs; etc.

2. In what four ways are most insects alike?
They have three pairs of legs, two pairs of wings, three body divisions, and an outside skeleton.

VOCABULARY

One of the strongest keystones of scientific efficiency lies in its vocabulary. The scientist say things precisely, accurately, and briefly. Probably one of the greatest quarrels the science teacher may have with the elementary level teaching today is vocabulary. The science teacher can have no use for vocabulary that is not precise and accurate. Precision in vocabulary is necessary for understanding and meaning of the concept or process being learned.

The words listed below are the basic vocabulary for the indicated area of study. After each word has been introduced, its meaning is to be maintained and extended at each succeeding level of study.

A

abdomen
adapt
adjust
adult
alike
alligators
amphibians
animal
antenna
aphid
aquatic
arthropod

B

baby
beak
bill
bird
blossoms
buds
bulb
butterfly

C

caterpillar
cell
characteristics
chrysalis
classification
claws
climate
climbing
cocoon
cold-blooded
colony
coloration
compound eye
conservation
contour
crack
cultivation

D

different
dinosaur
domestic
down

E

earthworm
eat
egg
environment
external
extinct

F

fall
fangs
farm
feather
feeler
fertilized
fins
flapping
flexible
flight
flood
fly

food
fossil
function
fur

G

garden
gills
glide
grasp
grow

H

habitat
harvest
hatch
hay
hibernate
hover

I

identify
insect
internal
invertebrate

J

jointed-legs

K

kingdom

L

larvae
lawn
leather
leaves
legs
living
lung

M

mammal
metamorphosis
migrate
modified
molt
move

N

nectar
nests
newts
nostrils
nymph

O

organism

P

parents
pelt
perch
pest
pets
plants
preening
prey
protect
pupa

Q

quillfeather

R

refuge
regeneration
reproduce
reptile
roe
roots

S

scales
segment
selective-breeding
senses
single-cellular
skeleton
skin
soar
spawn
specimens
spider
spiracles
sprout
stem
structure
swim

T

talons
tame
thorax
tree

U

V

vertebrate

W

walk
warm-blooded
water
weaned
webbed
weeds
wild
wildlife
wings

X

Y

yolk

Z

zoo

Children's Books

Books are a very essential part of the instructional materials in elementary schools which provide superior learning experiences for children. The selection of these books poses a difficult problem for librarians, teachers, and administrators because the science field is broad and increasing in scope and elementary school science programs are varied in nature. Some of the more common specific difficulties in choosing books are: (1) finding materials which deal with the varied interests of children; (2) locating material which gives information correlated with the local school district's instructional guide: (3) finding books of appropriate reading difficulty; and (4) selecting the best books from the many available.

The following list gives help related to the first three difficulties presented. Indirectly, it also helps with the fourth difficulty, for the best books cannot be selected until they are located. Further, the brief annotations should be of help in determining which books may be best for a given class. Finally, time should be saved in the selection of the best list if some information about the reading difficulty of available books is provided. It is hoped that this list will suggest for elementary teachers books that are supplementary to basic text series, and that these books will have value either as sources of information or for recreational reading.

It is always hazardous to specify an exact grade placement for a book because of variations in pupil reading ability in any class group, and because of different uses made of books. Consequently, the lowest grade level for pupil use is indicated. At lower levels these same books may be useful if the teacher reads to the children.

This list has been adapted from the publication of Children's Catalog (1966).

Zoological Sciences

Burnett, R. Will Zoology; an introduction to the animal kingdom, by R. Will Burnett, Harvey I. Fisher and Herbert S. Zim; illus. by James Gordon Irving. Simon & Schuster 1958 160p illus (A Golden Science guide) $3.95 "An introduction to the study of zoology. A brief description of animal evolution precedes an outlining of the animal kingdom in which many species are examined superficially. The processes of reproduction, the science of genetics, the physiology of animals, and evolution are quickly surveyed; such topics as migration, adaptation to changing environmental conditions, and geographical distribution of animal life merit each a page or two. While all of the material is accurately presented, it is neither thorough enough to be used as a reference source nor well organized enough to be used as a handbook.

Hegner, Robert Parade Of The Animal Kingdom by Robert Hegner assisted by Jane Z. Hegner; with over seven hundred illustrations. Macmillian (NY) 1935 675p illus $7.50 "Beginning with the protozoa the first division in the parade. Dr. Hegner . . . calls attention to the representative groups of animals. These range from sponges, worms and crustaceans, through insects, fish, amphibia, and birds to the mammals, flying, gnawing, hoofed, flesheating and aquatic. The primates are considered last."

Selsam, Millicent E. Exploring The Animal Kingdom; illus. by Lee Ames. Garden City Bks. 1957 64p illus map boards $2.50 (4-7) "The author describes the system used to classify the members of the animal kingdom and then proceeds to a separate consideration of vertebrate and invertebrate groups; the similarities and differences within and between groups is discussed. After a section on mammals, Mrs. Selsam traces the evolutionary process, mentioning briefly the fossil remains of prehistoric animals. Habits of animals are described, such as the way in which food is obtained, the way animals may live in colonies, some protective devices, some migratory practices, and some of the animals which are useful to man."

Ylla Animal Babies Story by Arthur Gregor; designed by Luc Bouchage Harper 1959 unp illus $3.50 (K-2) "Charming pictures of many different kinds of animals, domestic and wild, with their young. Small children will enjoy learning to identify the various animals. Readers of any age will marvel at the amount of material feeling that has been captured in these remarkable photographs."

Zoology

Barker, Will Winter-Sleeping Wildlife illus. by Carl Burger; forward by Ernest F. Swift. Harper 1958 136p illus $3.95 "An accurate and carefully detailed description of the phenomenon of hibernation in the life cycles of many North American animals. Included are the habits of mammals, birds, reptiles, amphibians, fishes, spiders, insects and mollusks. Carefully and appealingly illustrated."

Berrill Jacquelyn Wonders Of Animal Migration illus. by the author. Dodd 1964 96p illus maps $3.00 (5-7) A study "of animal migration opening with a warm, personal chapter about birds and bird-watching. The migration of . . . many creatures; and the homing instincts of bees and ants are described. . . It is noted that a little more is being learned by the aid of the Telstar satellite."

------Wonders Of The Fields And Ponds At Night illus. by the author. Dodd 1962 80p illus (Dodd, Mead Wonder bks) $3.00 (3-5) "Mammals, birds, insects, amphibians, and reptiles are presented (at dusk and at night) with . . . discussion of their homemaking, unusual habits of navigation and hibernation, sounds and odors."

------Wonders Of The Woods And Desert At Night illus. by Jacquelyn Berrill. Dodd 1963 78p illus (Dodd, Mead Wonder bks) $3 (3-5) The author "describes and illustrates animals who sleep by day and forage for food by night. . . . There are owls . . . skunks, mice, wood and pack rats, coyotes, cougars, opossums and bobcats. But there are also animals, birds, and insects one sees by day as well, such as frogs, foxes, ground squirrels, moose, bears and deer."

Blough, Glenn O. After The Sun Goes Down the story of animals at night; pictures by Jeanne Bendick. McGraw 1956 48p illus (Whittlesey House publications) $3.25 (2-4) "The author takes the reader into the woods and introduces him to some of the creatures that may be seen there at night, but that are seldom found during the day. Included are: whipporwills, owls, flying squirrels, opossums, bats, crickets, katydids, grasshoppers, moths, fireflies, frogs, and beavers."

------Who Lives In This House? A story of animal families; pictures by Jeanne Bendick McGraw 1957 48p illus (Whittlesey House publications) $3.25 (1-3) "Natural history for younger readers presented in an easy-to-read narrative and pictures. The author and the illustrator . . . here take a peek into an old house on Highway 12 to tell who its inhabitants are--a family of robins, mud-dauber wasps, squirrels, skunks, bees, and spiders,--and how they build their homes, (affect the balance of nature) raise their young and live together."

------Who Lives In This Meadow? A story of animal life; pictures by Jeanne Bendick. McGraw 1961 47p illus (Whittlesey House publications) $2.75 (1-3) "A lively assortment of small creatures--woodchucks, snakes, worms, ants, rabbits, crayfish, and others--shown at home in (and adapting to) the meadow which supplies food and shelter."

Branley, Franklyn M. Big Tracks, Little Tracks illus. by Leonard Kessler. Crowell 1960 unp illus (Let's read and find out bks) $2.95 (K-2) "The author shows the tracks of a child and two dogs and then asks the young readers to identify the tracks of other animals. There are tracks of cats, snakes, birds, ants, and rabbits."

Bridges, William Zoo Babies Morrow 1953 94p illus lib. bdg. $3.14 (2-5) "Thirteen simply told, true stories of some of the engaging baby animals in New York's Bronx Zoo."

------Zoo Pets Morrow 1955 94p illus $3.25 (2-5) "Simple, lively stories with appealing photographs of nine favorite animals in the New York Bronx Zoo. Included is a lovable monkey, friendly hummingbird, stubborn sea lion, a shy hippopotamus, and Candy, the elephant introduced in "Zoo Babies" (entered above). Good for preparatory reading for visiting zoos and nature study for older slow readers."

Brown, Vinson How To Understand Animal Talk with illus. by William D. Berry. Little 1958 205p illus $3.75 (5-7) "Everyone interested in animals knows that some animals "talk;" that is, communicate their feelings and wishes quite unmistakably. . . . This book tells how to sharpen your senses in order to detect the language of animals and how to interpret what they are saying with sound, movement, and sign."

Buck, Frank Jungle Animals by Frank Buck, written with Ferrin Fraser; illus by Roger Vernam. Random House 1945 55p illus boards $1.95 (5-7) A large, profusely illustrated book of "interesting facts about some of the animals, birds, and reptiles of jungle and veldt that the author has known in his many years of travel in the jungle countries of the world. Told informally with frequent reference to his experiences trailing and capturing these creatures."

Burton, Maurice Animal Senses illus. by Jane Burton, Van Nostrand (1965 c1961) 133p illus boards $3 (4-6) First published 1961 in England "Discussed in this book are the senses of sight, smell, hearing, taste and touch as well as some of the unusual senses some animals have that man does not."

Cosgrove, Margaret The Strange World Of Animal Senses illus by the author. Dodd 1961 94p illus $3 This book is a "study of the fascinating ways in which animals use their five senses--and a few other extraordinary powers like the homing instinct and the migratory instinct."

Durrell, Gerald The New Noah illus by Ralph Thompson. Viking (1964 c1954) 223p illus maps $3.50 "Anecdotes about the collection and transportation of some very unusual animals such as six foot long lizards from Africa's Cameroon, hairy armadillos from Paraguay and Argentina, and anteaters and four-eyed fish from Guiana. Discusses problems in the care, feeding, and handling of wild animals."

Fox, Charles Phillip When Winter Comes story and photographs by Charles Phillip Fox. Riley and Lee 1962 29p illus $2.95 (K-3) "Shows where small animals--possum, raccoon, fox, squirrel, chipmunk, rabbit and others--go during the months of cold and snow."

George, Jean Snow Tracks story and pictures by Jean George. Dutton 1958 62p illus lib. bdg. $2.64 (k-3) "The author has taken a few typical tracks and let them tell their own tales of what happened to the white-footed mouse, the weasel, the skunk, the fox, and the boy, all of whom ventured out on a day following a fresh fall of snow. The style, having the tracks seem to speak, may prove slightly confusing to young readers at first, but the exceedingly clear drawings and the unfolding of the forest drama will capture and hold the reader's interest."

Green, Margaret (ed) The Big Book Of Wild Animals comp. and ed by Margaret Green pictures by Janusz Grabianski. Watts, F. 1964 236p illus $4.95 (4-7) Accounts and stories portray "tigers, lions, monkeys, wolves, skunks, foxes, giraffes, elephants, cobras, seals, badgers, and deer as they have been observed by . . . Gerald Durrel, Kipling, W. H. Hudson, Jack London, Emil E. Liers, Henry Williamson, Osa Johnson, Hans Fallada . . . Robert McClung, Père Castor and Joseph Chipperfield."

Green, Mary McBurney Everybody Has A House (and) Everybody Eats. Scott, W. R. 1961 2v in 1 illus (Young Scott Bks) $2.75 (K-2)

The first story "tells how birds, cows, dogs, and other familiar animals, as well as people, solve their housing needs. . ."Everybody Eats" tells us how, just as we eat supper, a horse eats hay, a bird enjoys worms, and everybody eats something."

Hogner, Dorothy Childs Odd Pets photographs by Lilo Hess. Crowell 1951 166p illus. $3.75 (4-) "This book tells how to care for living things that make their homes in nature--in ponds or rivers, in woods or fields, or in one's garden--but unexpectedly may come, or be brought, into the house. . . Each life history is given in both photographs and text, so that the young naturalist will understand exactly what care is needed in an artificial environment."

Hyde, Margaret O. Animal Clocks And Compasses from animal migration to space travel; illus. by P. A. Hutchison. McGraw 1960 157p illus. maps (Whittlesey House publications) $2.95 "The uncanny sense of time and direction observed in animals and to a slighter degree in humans is reviewed as illustrated in certain birds, fish, insects and mammals. These, the author tells us affect migration, hibernation, honeybee, swarming and dancing cat-flight and the spring-buck-lemming mass suicide. Some of the theories advanced to account for these conditions are briefly indicated. And the possibilities which hibernation holds for space travel are examined. The final chapter suggests a few easy science projects along this line which the interested reader may engage in at home. . . Useful material for his general science class and interesting information about natural phenomena."

Lavine, Sigmund A. Wonders Of Animal Architecture illus, by Maragret Cosgrove. Dodd 1964 63p illus. (Dodd, Mead Wonder bks) $3.00 (3-6) Illustrated with drawings and diagrams, this "describes the interesting, and sometimes complex, homes that some birds, fishes, insects, mammals and reptiles build."

-----Wonders Of Animal Disguises illus. by Margaret Cosgrove. Dodd 1962 63p illus. (Dodd, Mead Wonder bks) $3.00 (3-6) "Descriptions and examples of the ways in which nature protects animals by providing them with seasonal color changes, markings, and other features so that they can blend with their surroundings and thus escape notice."

Laycock, George Never Pet A Porcupine illus. with photographs. Norton 1965 167p illus. $3.00 (5-7) The author "observes the habits of twenty-two animals and insects--the porcupine, owl, crow, cricket, woodchuck, earthworm, and others--who have learned to survive in man-made cities and suburbs."

Lemmon, Robert S. All About Strange Beasts Of The Present illus by Rudolf Freund. Random House 1957 148p illus (Allabout bks) $1.95 (4-6) "Brief sketches of many stange animals of North and South America, the polar regions, the tropics, and the ocean. The young reader learns about creatures such as vampire bats, anteaters, the duckbilled platypus, and the giant manta ray: what they eat, how they protect themselves, how they travel and other important facts."

McClung, Robert M. All About Animals And Their Young; written and illus. by Robert M. McClung. Random House 1958 148p illus (Allabout bks) $1.95 (4-6) "How different kinds of animals reproduce and care for their young, explaining animal "family life" (or lack of it), the feeding of offspring, nests and burrows and the "mother instinct."

Mason, George F. Animal Baggage; written and illus. by George F. Mason. Morrow 1961 94p illus. $2.95 (4-7) "Baboons, bats, bowerbirds, and honeybees are among the many animals that carry some form of baggage. It may be food, nesting material, their young, or even their homes. In this book the author describes the habits of these and many other animals, birds and insects who are accustomed to carrying baggage."

-----Animal Clothing. Morrow 1955 illus. lib. bdg. $2.94 (4-7) A discussion of animals' "protective coverings. Includes animals with hair, with feathers, with skin, with armor, and insect clothing. The information is presented in a straight-forward factual style that is easy to understand and interesting to read."

-----Animal Habits; written and illus. by George F. Mason. Morrow 1959 93p illus. $2.75 (4-7) "This book examines a wide range of behavior patterns and incidents of animal activity usually attributed to human beings. Contents: Animal habits; Instinct; Animal intelligence; Interpretation of animal behavior; Communication; Neatness and cleanliness; Affection and grief; Nestbuilding habits; Survival. '

-----Animal Homes. Morrow 1947 96p illus. lib. bdg. $2.94 (4-7) Brief descriptions "show how some of the commoner animals build their nests. A few insects and fish are included."

-----Animal Sounds. Morrow 1948 96p illus. lib. bdg. $2.94 (4-7) Contents: Animals sounds; Bird songs; Spring songs; Favorite songsters; Noises in the night; Penguins; Prairie chicken; Wing sounds; Insect music; Spring peepers; Singing mice; Silent voices; Warning signals; Coyotes; The moose; Frightening noises; Zoo animals.

-----Animal Tails; written and illus. by George F. Mason. Morrow 1958 95p illus. lib. bdg. $2.95 (4-7) "By describing and picturing their tails and how they use them, the author provides information about porcupines, horseshoe crabs, tropical birds, and many other creatures."

-----Animal Tools. Morrow 1951 94p illus. lib. bdg. $2.94 (4-7) "This book traces the parallels between man-made machines and the natural equipment of animals. Contents: Feet as tools: Insect drills: Chisels and knives; Bee's tool kit; Fly's gyroscope; Mosquito surgery; Goggles and flashlights; Pecking and probing tools; Stone tools and a sewing machine; Toilet articles; Spinning tools; Devil's darning needle; Tails as tools."

------ Animal Tracks. Morrow 1943 95p illus. lib. bdg. $2.94 (4-7) "A guidebook designed to aid in the identification of the tracks of more than 40 common North American animals. There is a full-page drawing of each animal, with descriptive text on its tracks, habits, and range. Tracks are pictured in marginal drawings, giving dimensions and showing both the perfect footprints and those of the animal in motion."

------ Animal Weapons. Morrow 1949 94p illus. lib. bdg. $2.94 (4-7) "Weapons that aid in animal survival--horns, hoofs, claws, teeth, poison, odor, stings, quills."

Murie, Olaus J. A Field Guide To Animal Tracks; illus. by the author. Houghton 1954 xxii, 374p illus. (The Peterson Field guide ser) $4.95 This handbook includes "drawings of the tracks and droppings of North and Central American mammals and some 30 birds, some reptiles, and a few insects. Each animal is sketched in addition, and some of its characteristic habits are described."

Rounds, Glen Swamp Life . . . The many pictures were drawn in the swamp by the author. Prentice-Hall 1957 117p illus $3.95 (5-7) "An almanac dealing with raccoons, possums, snakes, turtles, hell divers, wood ducks, and others who live in the hollow trees, tangled thickets, and swampy places along Little Fiery Gizzard Creek. With a few words of advice on how to see and become acquainted with them."

------ Wildlife At Your Doorstep; text and drawings by Glen Rounds. Prentice-Hall 1958 115p illus. $3.50 (5-7) At head of title: An illustrated almanac of curious doings, dealing with wasps, spiders, snakes, toads, birds, ants, squirrels and other kinds of small wildlife that can be found working at complicated trades within sight of my doorstep with a few words, also, concerning oldtime magic, snake doctors and cowkillers."

Sarasy, Phyllis Winter-Sleepers; illus, by Edna Miller. Prentice-Hall 1962 64p illus. $3.50 (3-5) A story with numerous sketches of hibernation--the patterns and habits of full-time and part-time animal sleepers. The author describes how many forms of wildlife prepare for, and live during the long winter months."

Schwartz, Elizabeth When Animals Are Babies, by Elizabeth and Charles Schwartz; illus. by Charles Schwartz. Holiday 1964 unp illus. lib. bdg. $3.25 (K-2) Brown, green, and yellow pencil drawings accompany this simple "introduction to 28 baby animals, contrasting the differences in species, sizes, feeding habits, growth, need for protection, and other characteristics."

Selsam, Millicent E. How Animals Live Together; illus. by Kathleen Elgin. Morrow 1963 95p illus. lib. bdg. $2.94 (5-7) This book "discusses some of the many kinds of animal relationships; grouping together for warmth and protection, classes and "pecking order" the organization of herds and other mammal groups, insect societies, and association between species (symbiotic and parasitic)."

-----The Language of Animals; illus. by Kathleen Elgin. Morrow 1962 96p illus. lib. bdg. $2.94 (5-7) "The study of animal communication is discussed here in light of recent research in electronic machines which have made it possible to record animal sounds. Contents: The animal's point of view; Underwater signals: Frog, snake, and alligator language: The language of birds; Communication between mammals; Insect signal codes."

-----A Time For Sleep: How The Animals Rest; illus. by Helen Ludwig. Scott, W. R. 1953 unp illus. $2.75 (K-3) "The many different ways in which animals rest are explored and illustrated, explaining how some animals sleep standing up, some lying down, others hanging up-side down or roosting on a limb, and some with their eyes open. Also covers hibernation as a means of getting rest and of surviving difficult seasons of the year."

Webb, Addison Song Of The Seasons; illus. by Charles L. Ripper. Morrow 1950 127p illus $3.75 (2-4) "Spring is the season for babies; summer is the time for learning; autumn is the season for fasting; winter is the time for rest. It is in this framework that the doings of the bees, raccoons, squirrels, bears and other familiar animals are told."

Webb, Clifford Animals From Everywhere. (New and rev. ed.) Warne 1950 unp illus. $2.75 (K-2) "Children in the lower grades will enjoy these many strange as well as familiar animals (shown in their natural habitats) for they will be able to read (the book) for themselves. . . Excellent pictures."

-----Strange Creatures. Warne (1964 c1963) unp illus. boards $3.00 (K-2) A picture book of some familiar animals like the moose, and a "collection of African and Australian animals as well as odd fish and birds."

Zim, Herbert S. What's Inside Of Animals? illus. by Herschel Wartik. Morrow 1953 32p illus. $2.75 (2-5) Answers the questions: What's inside a clam? A starfish? An earthworm? A grasshopper? A fish? A frog? A dog? "As we learn about animals, we learn about ourselves. We see more of the world of life and our place in it. The youngest readers can learn a good deal from the pictures in this book. Those a bit older will use the pictures plus the large-type text and captions. The detailed text in smaller type is for adults who want to read to children or for young people who are better readers."

Marine Zoology

Berrill, Jacquelyn Wonders Of The Seashore; illus. by the author. Dodd 1951 69p illus. $3.00 (4-6) "A book, with pictures on every page, about the shoreline animals--crabs, limpets, coral, barnacles, etc.--how they live, what they look like."

Fenton, Carroll Lane Wild Folk At The Seashore; illus. by the author. Day 1959 128p illus. $3.50 (3-6) "Partial contents: Larus, a hungry gull; Changing seashore; Snails, barnacles, and seaweeds; A starfish and her neighbors; Pecten and other bivalves; Lol Squid and an octopus; Lobsters and shrimps; Crabs of several kinds; Fish in a bay; Seals, sea lions, and small whales. Well indexed, and the excellent pen-and-ink illustrations. . . add very much to the book."

Freuchen, Peter Peter Freuchen's Story About Life In The Seven Seas, by Peter Freuchen with David Loth; illus. by Wilfrid S. Bronson. Messner 1959 63p illus. music $3.50 (5-7) "Life in the sea is shown in all its aspects, from the beginnings of life through population and food problems, with descriptions of creatures that inhabit the waters, and comments on the intelligence of these fish, birds, and animals and their courtship and reproduction habits."

Hausman, Leon A. The Illustrated Book Of The Sea; text by Leon A. Hausman and Felix Sutton; illus. by Art Renshaw and Herman Bischoff. Grosset 1957 101p illus. boards $3.95 (4-7) "The living creatures of the marine world are described and pictured in an oversize book. Since all phyla of animals, from protozoans to huge mammalian whales, are included, the space given to each is necessarily brief. While the book has small flaws (descriptions that do not correspond to the illustrations, for example), the information is presented in interesting fashion, a good general survey is given, and the illustrations are highly decorative as well as informative."

Headstrom, Richard Adventures With Freshwater Animals; illus. by the author. Lippincott 1964 217p illus. $4.25 (3-6) "The author discusses the lives, habits and characteristics of such fresh water animals as fishes, frogs, water tigers, fairy shrimp, leeches, newts, and snails. Includes simple experiments for raising and observing these creatures."

Huntington, Harriet E. Let's Go To The Seashore; illus. with photographs by the author. Doubleday 1941 88p illus. $3.50 (K-4) "A book about the small creatures that live in the sea, on the seashore, and on the rocks under the water--written to satisfy the curiosity of young children when they begin to ask questions about the small things they find on the beach, including the sand and the sea itself."

Jacobs, Lou Wonders Of An Oceanarium; the story of marine life in captivity (by Lou Jacobs, Jr. illus. with photographs; foreword by David H. Brown. Golden Gate 1965 78p illus. $3.75 (4-7) "A brief text and more than 75 outstanding photographs give an inside view of an oceanarium--its function and personnel and the capture, care, training, and exhibition of its inhabitants. The oceanarium described is Marineland of the Pacific in California."

Morgan, Ann Haven Field Book Of Ponds And Streams; an introduction to the life of fresh-water . . . Putnam 1930 448p illus. (Putnam's

Nature field bks) $5.00 "The common forms of plant and animal life found in fresh-water are described. . . Convenient arrangement, numerous illustration, and an index of the scientific and common names. . . Much information about insects, fish, amphibians, and methods of collecting is included."

Selsam, Millicent See Through The Sea, by Millicent Selsam and Betty Morrow; pictures by Winifred Lubell. Harper 1955 unp illus. $2.95 (2-4) "In each part of the sea, the plant and animals are different. Turn the pages of this book and you will see through the sea, where it is shallow, deeper and deepest. A description of the teeming life (mainly animals and fish) of the sea, from the sea-shore, down through the various levels of the ocean, to its depths. It is amplified by arresting pictures and diagrams in predominating tones of green, yellow and black."

Starfishes

Hurd, Edith Thacher Starfish; illus. by Luciene Bloch. Crowell 1962 unp illus. (Let's -read-and-find-out bks) boards $2.95 (k-2) "An easy introduction to the world of starfish. Touches on the feeding habits, life cycle, structure, and power of regeneration of these interesting creatures."

Mollusks. Shells

Abbott R. TucKer Sea Shells Of The World a guide to the better-known species; under the editorship of Herbert S. Zim; illus. by George and Marita Sandstrom. Golden Press 1962 160p illus. maps (A Golden Nature guide) $3.95 (5-7) "Offers information about collecting and preserving shells and outlines the geographical areas of shell distribtuion. It then describes various species of marine shells. Including mollusks, limpets, top shells, cowries, conches, whelks, oysters, clams, and volutes."

Cavanna, Betty The First Book Of Sea Shells; pictures by Marguerite Scott. Watts, F. 1955 38p illus. $1.95 (3-6) "An introduction to the study of sea shells, giving in clear precise terms information on how shells are found, some of the more common varieties of shells; how and where they live, and how to build a shell collection or a salt-water aquarium. Some shells are pictured, but the chief value of this book will be to stimulate interest in the subject rather than for use as a book on shell identification. An attractive and useful book for home and library collections."

Clemons, Elizabeth Shells Are Where You Find Them; illus. by Joe Gault. Knopf 1960 86p illus. (Nature study bks) $2.95 (3-5) "The first part of the book deals with gathering shells and how to keep them; the second part names and describes the shells and tells where, both on the Atlantic and Pacific coasts, they can be found. Each shell is illustrated for easy identification. Both the common and scientific names are given."

Dudley, Ruth H. Sea Shells; illus. by Phoebe Erickson. Crowell 1953 149p illus. $3.00 (3-6) A "readable though in no sense comprehensive treatment of shells, such as the limpet, piddock, cowry, conch, and starfish. Describes structure, habits and habitats of these shell fish and gives advice on where to look for the shells and how to prepare and keep a shell collection. Appendixes list shell clubs in the U. S. and books about sea shells."

Earle, Olive L. The Octopus; illus. by the author. Morrow 1955 62p illus. lib. bdg. $2.94 (4-6) "A straight-forward factual presentation of one of the more unusual, and most frequently misrepresented animals in the ocean. In clear precise text and excellent drawings the author describes the physical structure and way of living of the octopus, and relates it to other sea animals."

Goudey, Alice E. House From The Sea; illus. by Adrienne Adams. Scribner 1959 unp illus. $3.25 (K-2) "A scientifically accurate introduction to shells . . . which is at the same time an idyllic tale of two children filling their pails with these treasures while playing at the beach. The short lines of rhythmic prose describe a great variety of shells; their names, how they look, and how they serve as houses for animals of the sea . . . Even without pictures the text would give clear impressions; but the handsome, detailed color drawings of seashore life and activity turn it into a valuable and distinctive science picture book for kindergarten and beginning readers. Teachers have shown special interest in it."

Hogner, Dorothy Childs Snails; illus. by Nils Hogner. Crowell 1958 81p illus. $2.75 (3-5) "The text not only describes many species of snails and their habitats and explains their life cycle, but also suggests how to have fun keeping land snails in a "snailery" and water snails in an aquarium. Many soft-pencil drawings, lovely in effect but detailed, too, with diagrammatic anatomical sketches, add value to the book."

Johnstone, Kathleen Yerger Sea Treasure; a guide to shell collecting; illus. by Rudolf Freund and René Martin. Houghton 1957 242p illus. $4.00 "Partial contents: Starting your own collection; Shells belong to the animal kingdom When and where to find shells; Exchanging, buying and sharing; Cleaning--labeling--storing; What makes a shell "rare"; Some interesting mollusks; American Indian shell money; Other ways Indians used shells."

Verrill, A. Hyatt The Shell Collector's Handbook. Putnam 1950 228p illus. $4.95 "An informal, easy-to-use guide for all shell collectors with 100 line illustrations and 16 pages of photographs. It describes the mollusks' strange ways, their lives and habits, their habitat, and the formation of shells. It tells how to clean and care for shells, how to identify and classify them, how to pack and ship them, and how to arrange exchanges."

Crabs. Spiders. Worms

Adrian, Mary Fiddler Crab; illus. by Jean Martinez Holiday 1953 44p illus. lib. bdg. $2.75 (1-3) "Traces the life cycle of a fiddler crab. The difficulties, dangers, and narrow escapes of this crab present some of his many enemies and problems in surviving."

David, Eugene Spiders And How They Live; illus. by Delos Blackmar. Prentice-Hall 1964 72p illus. (A Junior research bk) $3.50 (3-6) A "description of the general characteristics of all types of spiders, with explicit drawings (including a cross-section of the anatomy of a spider) with common and scientific names, and complete pronouncing guides for the latter. The eccentricities of a variety of spiders, such as the wolf spider, jumping spider, crab spider, tarantula, etc. add to the interest. Includes suggestions for catching, feeding and observing."

Goldin, Augusta Spider Silk; illus. by Joseph Low. Crowell 1964 unp illus. (Lets read-and-find- out science bks) boards $2.75 (1-3) "A fascinating story about spiders--how they hatch, how they spin silk, where the silk comes from and how spiders catch their food."

Hogner, Dorothy Childs Earthworms; illus. by Nils Hogner. Crowell 1953 51p illus $2.75 (1-4) "An accurate introduction to the earthworm. Tells how this creature eats, sees, and hears. Also provides instructions for starting an earthworm farm." "This easily-read study of the common earthworm leaves the reader in no doubt about the importance of its service as 'nature's plow' and as a source of fertilizer."

-----Spiders; illus. by Nils Hogner. Crowell 1955 56p illus. $2.75 (2-4) "An interesting and informative little book on spiders that covers physiology, life cycle, kinds, habits, and web spinning, shows how spiders differ from insects, talks about spider watching and web study, and tells how to collect spider webs. Clearly written and illustrated."

Holling, Holling Clancy Pagoo; illus by the author and Lucille Webster Holling. Houghton 1957 86p illus. lib. bdg. $3.40 (4-7) "The life cycle of the hermit crab and a close-up of the teeming life of the tide pool are presented, as in the author's earlier books, in an animated narrative, scientifically detailed marginal drawings, and handsome full-page colored pictures. Although adults are likely to feel that the crab is humanized and to be irritated by the facetious, overly colorful writing, children will find the story of Pagoo both exciting and informative."

Milne, Lorus The Crab That Crawled Out Of The Past (by) Lorus & Margery Milne; drawings by Kenneth Gosner. Atheneum Pubs. 1965 84p illus. $3.50 (4-7) "A fisherman closely examines a horseshoe crab found at the seashore. Subsequent description of its appearance, habits, life cycle, and history are detailed. . . In telling the true tale of a curious creature, the authors correlate many disciplines; zoology, archaeology, ecology, history."

Insects

Adler, Irving Insects And Plants (by) Irving and Ruth Adler. Day 1962 48p illus. (The "Reason why" ser) $2.00 (3-5) "Explaining the relationship between insects and plants, the authors describe how these forms of life help one another, sometimes dominate one another, are useful or injurious to man, and survive in some peculiar and interesting ways."

Adrian, Mary Honey-Bee; illus, by Barbara Latham. Holiday 1952 49p illus lib. bdg. $2.75 (2-4) "The life of a worker honey bee, from egg to 'swarm time.' After describing her development in the cell, the story follows her various chores and stages--nursemaid, honey maker, wax maker, hive-farmer, and field bee."

Baranowski, Richard M. Insects; illus. by Dorothea and Sy Barlowe (and others). Golden Press 1954 104p illus. (The Golden Bookshelf of natural history) $3.95 "After general introduction to the anatomy and behavior of insects, this book presents, in alphabetical order, information about common insects of the world, their appearance and habits. The book is colorful . . . The emphasis is definitely on insects in relation to man, and because of that relationship, it seems that pests come in for more than their share of attention."

Barker, Will Familiar Insects Of America; illus. by Carl Burger; schematic drawings by Nancy Lloyd. Foreword by Hilary J. Deason. Harper 1960 236p illus. boards $5.95 "Describes the evolutionary development of insects, the curious way they live and reproduce, their influence on other living things, and their power as a living force."

Bartlett, Ruth Insect Engineers: The Story Of Ants; written and illus. by Ruth Bartlett. Morrow 1957 128p illus. $3.25 (4-6) "Besides describing and picturing various kinds of ants--their anatomy, social habits, and engineering feats--this book presents the good and bad aspects of ant behavior. Final chapter gives specific instruction on how to collect ants, place them in glass nests, and watch their activities."

Bronson, Wilfrid S. Beetles; written and illus. by Wilfrid S. Bronson. Harcourt 1963 160p illus. $3.25 (4-6) "An introduction to a variety of beetles telling how these insects are formed, how they work and live. It explains which are helpful or harmful to man. Information on collecting, preserving, and showing specimens is included. The author is gay, humorous, and chatty in telling of his 'bugs' and has a gift for passing along serious scientific information in an almost casual way, full of anecdotes and informal experiments. The book is absorbing from start to finish; and no matter how you feel about beetles, really fun to read."

Bronson, Wilfrid S. The Grasshopper Book; illus. by the author. Harcourt 1943 127p illus. $3.25 (4-6) A "study of the grasshopper and its relatives, the cricket, katydid, mantis, roach, and walking stick. Examines their 'machinery' and adaptations, metamorphosis, molting, and diet, particularly as the latter affects man."

-----The Wonder World Of Ants; illus. by the author. Harcourt 1937 87p illus. $3.50 (4-6) "Ants that make flower-ball homes in jungle trees, ants that grow mushrooms underground in great ant towns, the cattle keeping ants and the honey savers, as well as the ants that are beggars and others that are bandits or slave makers, all these are described, with their complex communal life and their amazing activities, customs and habits, in a graphic manner fascinating to the young reader. The author's many drawings and full-page color plates are executed with imagination, vigor, and frequent humor."

Conklin, Gladys I Like Butterflies; pictures by Barbara Latham. Holiday 1960 24p illus. lib bdg. $3.25 (K-3) "The running text could be a child's voice describing his experiences as he finds one exquisite butterfly after another, each one (twenty-six in all) pictured against a natural background in full color. The common names of butterflies and moths are included in the back of the book so that each can be identified by the child old enough to be interested."

-----I Like Caterpillars; pictures by Barbara Latham. Holiday 1958 unp illus. lib. bdg. $3.25 (K-3) "The purpose of this book is simply to show the beauty and the noticeable traits of many kinds of caterpillars commonly discovered by children in their yards."

-----We Like Bugs; pictures by Arthur Marokvia. Holiday 1962 unp illus. $3.50 (K-3) "Simple observations of common insects such as dragonflies, ants, grasshoppers, and lightning bugs are related through the voice of a child. Appealing writing encourages the young reader to notice and take interest in the abundant wildlife at his feet."

Darby, Gene What Is A Butterfly; pictures (by) Lucy and John Hawkinson. Benefic Press 1958 48p illus. (What is it ser) $1.80 (2-4) "Short, primary sentences and large color drawings present the most common species of butterflies, the metamorphosis, and their good and bad effects on man's plants. Also contains a clear comparison of moths and butterflies. The somewhat condescending style limits the book's appeal and usefulness to very young readers."

Doering, Harald An Ant Is Born, by Harald Doering (photographer) and Jo Mary McCormick (writer). Sterling 1964 96p illus. (Sterling Nature ser) $2.95 In this book "the photographs, many times enlarged, are equal in importance to the text. The 'story' includes the birth of an ant, its daily life, food, nest, varieties of ants and their function in the community. The photographs are outstanding, showing the structure of the ants' bodies, and their activities both with friends and enemies . . . The text is sufficiently detailed to be suitable for older readers, yet simple and lucid (for the younger ones)."

Earle, Olive L. Crickets. Morrow 1956 unp illus. lib. bdg. $2.94 (K-3) "Tells first about the common variety, the field cricket, covering such topics as development from nymph, or young cricket, to adult, anatomy, chirp-making equipment, feeding habits and habitat. Then some other varieties, e.g. snowy, cave and mole crickets are described and finally there is information about keeping a cricket as a pet."

Eeckhoudt, J. P. Vanden A Butterfly Is Born; text and photographs by J. P. Vanden Eeckhoudt. Sterling 1960 90p illus. (Sterling Nature ser) $2.95 (2-4) "The life cycle of the butterfly, the most colorful of the insects, is depicted here, through the stages of egg, caterpillar or larva, cocoon or chrysalis--until it emerges a beautiful butterfly."

Fenton, Carroll Lane Insects And Their World, by Carroll Lane Fenton. and Dorothy Constance Pallas; illus. by Carroll Lane Fenton. Day 1956 95p illus. map $2.95 (3-6) "A fascinating array of information about many species of insects, their behavior, anatomy, and physiology. Easy reading and many well-placed-drawings."

Foster, Virgil E. Close-Up Of A Honeybee; photographed by Martin Iger. Scott, W. R. (1960) 64p illus. $3.00 (3-5) "An account of the author's experience of reviving a honeybee buried in the sand. He then relates information about how bees live and work, gather their food and store it, and raise their young. There is a chapter on bee-keeping and honey-making."

Goudey, Alice E. Butterfly Time; illus. by Adrienne Adams. Scribner 1964 unp illus. $3.25 (1-3) A book that is "as lovely . . . (as it is) accurately detailed. . .Author and artist reproduce the world of 'winged beauty' in all its exquisite variety of color and pattern. The poetic, imagistic text and naturalistic four-color illustrations describe twelve butterflies commonly seen through the summer and into the fall. Included are a note on the life cycle of butterflies and a summary of their identification."

-----Here Come The Bees! Illus. by Garry MacKenzie. Scribner 1960 94p illus. lib. bdg. $3.12 (2-4) A "study of the honeybee. Here the author describes how these proverbially busy little insects build their hive, construct cells, feed larvae, guard their Queen, gather pollen, and store and make honey."

Hawes, Judy Bees And Beelines; illus. by Aliki. Crowell 1964 unp illus. (Let's read-and-find-out science bks) boards $2.75 (K-3) This book describes "the 'training' of bees when first they leave the hive, the use they make of the sun as a guide, the signal systems and dances they use to let the other bees know where the flowers are."

Hawes, Judy (Continued)

-----Fireflies In The Night; illus. by Kazuo Mizunura. Crowell 1963 unp illus. (Let's read-and-find-out science bks) boards $2.75 (K-3) "A little boy tells about catching fireflies and of the interesting things he learns about them from his grandfather and from his own observation and experimentation. . . Scientifically accurate (picture) book."

Headstrom, Richard Adventures With Insects; illus. by the author. Lippincott 1963 221p illus. $4.25 (4-6) "Thirty-nine studies of the lives and habits of representative insects, with accompanying experiments, provide information about those that may be readily caught and examined."

Hogner, Dorothy Childs Butterflies; illus. by Nils Hogner. Crowell 1962 69p illus. $2.75 (2-5) "The author tells how butterflies can be identified and where the different kinds can be found. She describes the bodily structure. Some of the varieties covered are: American copper, cabbage, swallowtail, wood nymph, mourning cloak, wanderer, and red admiral."

-----Grasshoppers And Crickets; illus. by Nils Hogner. Crowell 1960 61p illus. $2.75 (2-5) "The author tells how grasshoppers and crickets are formed; how to tell the difference between the many varieties; and explains how they live, eat, and reproduce. Included is information on the ancient Oriental custom of keeping crickets in cages to provide music, and instructions on how to make a cage, capture, and care for a cricket."

-----Moths; illus. by Nils Hogner. Crowell 1964 69p illus. $2.75 (2-5) "Concise, plain description of the characteristics and life cycle of moths, in general, and of those likely to be seen or heard about, in particular. Among those included are plant pests, clothes moths, silkworm moths, and garden residents. Understanding and identification are enhanced by sharp illustrations."

-----Water Beetles; illus. Nils Hogner. Crowell 1963 57p illus. $2.75 (2-5) The author "describes how water beetles live and eat and reproduce. There are . . . illustrated accounts of the different beetle families. One section tells how to collect water beetles, and another gives instructions on making an aquarium in which to keep them."

Huntington Harriet E. Praying Mantis; illus. with photographs by the author. Doubleday 1957 44p illus. board $2.50 (2-4) The author follows the praying mantis' "life cycle from birth to metamorphosis, describing what and how it eats, how and where it lives, and revealing many intriguing facts concerning this fascinating insect."

Hussey, Lois J. Collecting Cocoons (by) Lois J. Hussey and Catherine Pessino; illus. by Isabel Sherwin Harris, Crowell 1953 73p illus. $3.50 (4-6) This book "describes the four stages in the development of the moth, how cocoons are made, where and when to look for cocoons, how to collect and care for them, how to breed moths, and how to keep a collection of cocoons. The last half of the book consists of identification data on 19 moths. . . A good basic book for beginners."

Hutchings, Carleen Maley Moon Moth; illus. by Douglas Howland. Coward-McCann 1965 unp illus. $2.75 (2-4) "The life story of this night-flying beauty throughout the seasons of a single year--emerging from her brown-walled cocoon, courting, mating, and laying eggs that grow to become adults moths."

Hutchins, Ross E. Insect Builders And Craftsmen; with 70 photographs by the author. Rand McNally 1959 96p illus. $3.50 (5-7) "An entomologist first discusses instinct and intelligence in insects, then describes with enthusiasm the habits, behavior, and homebuilding methods of some of the more interesting insect architects such as the paper hornet, carpenter bee, mud dauber, leaf cutter, caddis worm, and termite. A final chapter offers suggestions for studying these insects at work."

-----Insects-Hunters And Trappers; with 60 photographs by the author. Rand McNally 1957 illus. $3.50 (5-7) "Scientific facts about characteristics and activities of insect life, e.g., the dragonflies, the pursuit planes of the insect world; the robber flies and assassin bugs, the monsters of the garden; the spider robbers and vampire wasps, members of the insect underworld; and the pious fraud, the mantis. Also, includes hints for young naturalists."

Klots, Alexander B. A Field Guide To The Butterflies Of North America, East Of The Great Plains; illus. with color paintings of 247 species by Marjorie Statham and 232 photographs by Florence Longworth. Houghton 1951 349p illus. map (The Peterson Field guide ser). $4.50 "Describes and tells the reader how to identify butterflies found east of the Great Plains from Greenland to Mexico. It covers the habits, range, food plant of the caterpillar, and the type of country in which the butterfly is likely to be found."

Lavine, Sigmund A. Wonders Of The Anthill; illus. by Ernest H. Hart. Dodd 1960 64p illus. (Dodd, Mead Wonder bks) $3.00 (4-6) "An informative book which describes the anatomy of the ant, the composition of the ant colony, the development of an ant, various types of formicaries (anthills), and the behavior of six different kinds of ants such as army ants and Amazon ants. The book also discusses old beliefs about ants, notes their usefulness or harmfulness to man, and offers suggestions for making an observation nest."

-----Wonders Of The Beetle World; illus. by Margaret Cosgrove. Dodd 1962 62p illus. (Dodd, Mead Wonder bks) $3.00 Beginning with the folklore of beetles, this is a "general introduction to the family of Coleoptera. There is a detailed description of parts of a beetle and its life cycle and. . . accounts of six classes of beetles. The last page suggests an unlimited field for exploration in one's own yard or surrounding territory."

-----Wonders Of The Hive; illus. with photographs. Dodd 19[illegible] 92p illus. (Dodd, Mead Wonder bks) $3.00 (4-6) A "history of beekeeping, with a description of the habits of social and solitary baes, their life cycles, social organization, sensory perception, and special talents."

-----Wonders Of The Wasp's Nest; illus. by Ernest H. Hart. Dodd 1961 63p illus. (Dodd, Mead Wonder bks) lib. bdg. $3.00 (4-6) "Here is folklore of the ancient Romans, details of body structure of the wasp, its family life cycle and nest building. There is still much to observe and learn about the restless and wonderful wasp, and amateurs are invited to fill in some of the gaps."

Lemmon, Robert S. All About Moths And Butterflies; illus. by Fritz Kredel. Random House 1956 148p illus. (Allabout bks) $1.95 (4-7) An "inexpensive book on the major moths and butterflies of North America plus a few of the tropical butterflies. Detailed description of habits and life cycles, how to look at butterflies (even in large cities), and how to locate caterpillars and raise home specimens."

Lubell, Winifred The Tall Grass Zoo, by Winifred and Cecil Lubell Rand McNally 1960 unp illus. $2.95 (K-2) A "presentation of the animals which can be found in the back yard or in any field-the countless insects, snails, toads, and lizards-with a flowing and often poetic style and colorful (realistic) illustrations. In watching a cicada emerge from its old skin or an ant colony at work, the fascinating science of zoology comes alive for the child."

Lutz, Frank E. Field Book Of Insects Of The United States And Canada, aiming to answer common questions. 3d ed. rewritten to include much additional material; with about 800 illus. many in color. Putnam 1935 510p illus. (Putnam's Nature field bks) $3.95 "It is intended to be an introduction to commonly observed species and to the larger groups (general and particularly families) of insects. Although the species mentioned are, for the most part, inhabitants of northeastern United States, many of them have a wide distribution in this country and some of them in other continents. . . I have made an effort in this book to record the real names correctly and have given the nicknames when I knew them."

McClung, Robert M. Green Darner: The Story Of A Dragonfly; illus. by the author. Morrow 1956 48p illus. lib. bdg. $2.94 (1-4) "Green Darner is the biggest of the dragonflies that frequent the pond. . . How he survives the constant struggle of eat-and-be-eaten, how he sustains his flashing existence about the waters of the pond, and how the small dragonfly eggs and nymphs mature beneath its surface is the substance of this factual . . . story."

-----Luna: The Story Of A Moth; written and illus. by Robert M. McClung Morrow 1957 unp illus. lib. bdg. $2.94 (1-4) "A life cycle story of the Luna moth as it evolves from its cocoon, lays hundreds of eggs and lives just a few days. Only one of the six eggs laid on the walnut tree survives to become a caterpillar and pupa, because of the constant danger from other insects and small animals."

-----Sphinx: The Story Of A Caterpillar; written and illus. by Robert M. McClung. Morrow 1949 unp illus. lib. bdg. $2.94 (1-4) The author "has presented in story form the life span of a caterpillar. With a real gift for writing for young children, he makes of the facts a fascinating story. Print is large, and the charming black-and-white drawings, enhanced by the addition of green, show each step in the caterpillar's development to its maturity as a moth."

-----Tiger: The Story Of A Swallowtail Butterfly; written and illus. by Robert M. McClung. Morrow 1953 44p illus. lib. bdg. $2.94 (1-4) "Similar in format to the author's earlier attractive and popular nature books, this is a clearly presented picture of the life cycle of a butterfly (from egg to adulthood). Although simply written and very easily read, it nevertheless contains a great deal of information in its large type and many pictures in green, yellow and black."

Marcher, Marion W. Monarch Butterfly; illus. by Barbara Latham. Holiday 1954 42p illus. $2.75 (1-4) "In clear, simply written text and excellent illustrations the story of a monarch butterfly is told from the time the egg is laid on a milkweed leaf until the butterfly itself has reached maturity and has laid its share of eggs for future generations of butterflies."

Mitchell, Robert T. Butterflies And Moths: A Guide To The More Common American Species, by Robert T. Mitchell and Herbert S. Zim; illus. by Andre Durenceau. Golden Press 1964 160p illus. (Golden Nature guide) board $3.95 "So numerous are North American species that only about three per cent have been included, but these were selected to include the most common, widespread, important, or unusual kinds. . . .(Includes) range maps which show distribution."

Phillips, Mary Geisler Dragonflies And Damselflies; illus. by Anne Marie Jauss. Crowell 1960 95p illus. $3.50 (4-7) In this "book the author first introduces the reader to the science of taxonomy, the system of classification for all living matter. Within this framework she presents the structure of the dragonfly and damselfly, their life cycle and habits. She describes exactly where to find them: how to identify them; how to collect and preserve them."

Poole, Lynn Weird And Wonderful Ants, by Lynn & Gray Poole; illus. by R. F. Peterson. Obolensky 1961 117p illus. $3.50 (5-7) "An introduction to the social ants, showing them at their daily tasks of feeding and raising the young, getting ready for winter, and protecting themselves against invaders. In addition there are many unusual ants, found throughout the world; the cowherders, the parasol ants, the army ants, and the carpenter ants."

Postal, Colett The Life Of A Queen. Braziller (1964 c1962) unp illus. $2.95 (K-3) This is a story of the queen of the blue ants, and of "how the ants are born, hundreds upon hundreds, how some grow up to become workers. . . while others serve as hunters to bring home food for all, and still others become soldiers. . . But there comes a time when life becomes too easy for the inhabitants of the ant city, and they (are invaded)."

Sears, Paul McCutcheon Fire-Fly; illus. by Flen Rounds. Holiday 1956 37p illus. (Life-cycle stories) $2.75 (2-4) "Traces in narrative style, the life cycle of the firefly, describing its different stages of development and its habitat, and explaining its light in so far as is known to science. Very attractive illustrations and format."

Selsam, Millicent E. Terry And The Caterpillars; pictures by Arnold Lobel. Harper 1962 64p illus. (A Science I can read bks) boards $1.95 (K-2) "Terry, a little girl, learns the life cycle of the moth-from caterpillar to cocoon to moth to egg and back to caterpillar again, when she finds three caterpillars and brings them home to observe."

Shuttlesworth, Dorothy E. The Story Of Ants; illus. by Su Zan N. Swain. Doubleday 1964 60p illus. boards $3.25 "The many types of ants and the variety of their habits are described in this book. Among the subjects discussed are life in the ant colony; the 'slave-makers' who kidnap larvae and raise them as slaves: nomadic ants that march in armies; ant-enemies; and termites."

Sterling, Dorothy Caterpillars; illus. by Winifred Lubell. Doubleday 1961 64p illus. boards $3.25 (3-6) An "introduction to caterpillars describes informally the life cycle of a butterfly or moth, the anatomical structure of a caterpillar, its eating habits, silk spinning enemies, and means of survival. The book also tells how to catch observe, and raise caterpillars."

-----Creatures Of The Night; illus. by Winifred Lubell. Doubleday 1960 125p illus. boards $2.95 (3-6) "The characteristics, habits, and history of the fascinating insects whose activities increase as night falls are described in this book. The reader will learn how to identify them and how to collect them for study."

-----Insects And The Homes They Build; with photographs by Myron Ehrenberg. Doubleday 1954 125p illus. $3.50 In this book "chief attention is paid to (insects') ingenious methods of building homes. Grouped according to the materials they use silk, bubbles, mud, paper, wax, wood and plants--there are wasps, spiders, the froghopper and praying mantis , ants and bees. The story of their life cycle and domesticity, and particularly of their individual styles of carpentry and masonry, makes a book of ageless interest. The photographs, with interior scenes and cross-sections of homes, add greatly to the book's scientific value."

Stevens, Carla Catch A Cricket; about the capture and care of crickets, grasshoppers, fireflies and other companionable creatures; photos by Martin Iger. Scott, W. R. 1961 95p illus. (Young Scott bks) boards $3.00 (K-2) A "book which instructs young children in the care and feeding of crickets, grasshoppers, caterpillars, worms, fireflies and other tiny creatures that can be temporarily housed in glass jars, while their habits are studied by the very youngest naturalists."

Swain, Su Zan Noguchi The Doubleday First Guide To Insects; written and illus. by Su Zan Noguchi Swain. Doubleday 1964 32p illus. $1.50 (2-4) "After brief explaining general facts about insects, this book aids the young nature explorer in identifying more than 40 insects that can be seen in the air, on plants and trees, or in ponds."

-----Insects In Their World; written and illus. by Su Zan Noguchi Swain. Garden City Bks 1955 53p illus. boards $3.50 (4-7) "This includes a good deal of information about the development of insects, their anatomy, their homes, and the ways in which they protect themselves from their enemies. But mainly it is a book on collecting with suggestions for the equipment necessary, ideas on what and where to collect and the fun of building a live collecion. Pictures, some in black and white, help explain everything, and many in color provide a useful identification guide. The book is indexed and has a bibliography which, though brief, lists very good books for further reading."

Teale, Edwin Way Grassroot Jungles; a book of insects. Rev. ed. illus. with one hundred and thirty photographs by the author. Dodd 1953 240p illus. $6.00 "The story of field insects--the praying mantis, the robber flies, the giant moths, the cicadas, spiders, the wasps, ants, crickets, bees, aphids, and hosts of others. Includes chapters on insect photography and study."

-----Insect Friends;illus. with photographs by the author. Dodd 1955 96p illus. $3.75 "Introduces 28 of the most familiar insects, many of them found in the back yard or weed lot, describing the physical characteristics, habits, and abilities that make them fascinating to observe. Of special interest and value are the fine photographs on almost every page, selected from among the author's best. An introductory chapter differentiates between beneficial and injurious insects and explains why the latter are destructive."

Tee-Van, Helen Damrosch Insects Are Where You Find Them; written and illus. by Helen Damrosch Tee-Van. Knopf 1963 75p illus. $2.95 (3-6) "After explaining the scientific classification of insects (the author) describes and pictures fifty insects giving for each the precise scientific name of the subclass, order, family and species. There is a chapter on the common characteristics of all insects, (and) one on collecting and preserving specimens."

Williamson, Margaret The First Book Of Bugs; written and illus. by Margaret Williamson. Watts, F. 1949 44p illus. $1.95 (2-4) "Crickets, moths, spiders, ants, bees, daddy longlegs, mosquitoes and many other bugs are to be found in this book. Here are stories about where they can be found, what they like to eat, what they do for a living, how they build their homes, and what their children look like at different stages."

Zim, Herbert S. Insects: A Guide To Familiar American Insects, by Herbert S. Zim and Clarence Cottam; illus. by James Gordon Irving. Sponsored by The Wildlife Management Institute. (Rev. ed) Golden Press (1961 c1956) 160p illus. maps (A Golden Nature guide) pa $1.00 "An excellent handbook for the young naturalist. A Key to Insect Groups is included to help in identification and there are colored pictures on every page. Many authorities in the field have been consulted to assure the accuracy of the book."

Fishes. Amphibians

Bendick, Jeanne The First Book Of Fishes. Watts, F. 1965 72p illus. $2.65 (3-5) "An introductory book that contains an amazing amount of information about familiar and unusual fish: 'what they look like, where they live, how they protect themselves, what they eat and how they reproduce.' Included also is a chapter on things that live in water that are not fish: whales, porpoises, jellyfish, octopuses, clams, etc. Numerous illustrations and diagrams (by the author)."

Bronson, Wilfrid S. Pollwiggle's Progress; pictures and story by Wilfrid S. Bronson. Macmillan (N Y) 1932 122p illus. $3.00 (3-5) "This book tells and pictures a bullfrog's life through the various stages from frog's egg to polliwog, from polliwog to frog, until at the end of a two years' span Pollwiggle has grown to maturity. The insect, plant, and animal life of pond, stream, and field is also described."

Burger, Carl All About Fish; written and illus. by Carl Burger; foreword by James W. Atz. Random House 1960 138p illus. $1.95 (4-6) "Written with an easy informality that communicates the author's interest in his topic. The illustrations are good, and are identified in the index by the use of italics. Topics covered are classification of fish, their evolution, tall fish tales, freshwater and saltwater fish, fish as food, pets of sport, fish that travel to spawn, and fish of the coral reefs. A list of suggestions for further reading is appended."

Darby, Gene What Is A Frog. Pictures: Lucy and John Hawkinson. Benefic Press 1957 47p illus. (What is it ser) $1.80 (K-2) "The metamorphosis from tadpole to frog is presented in simple form with general information about the habits of these animals.

The peculiarities of several kinds of frogs, such as the tree and bull frogs, are given. Simple presentation with helpful pictures."

Flack, Marjorie Tim Tadpole And The Great Bullfrog. Doubleday 1934 unp illus. boards $2.50 (K-2) "Tim Tadpole, who lived in a pond near the edge of a wood, felt sorry for himself because he could not sing and jump like the Great Bullfrog. He decided to swim instead and at last there came the wonderday when he realized both of his ambitions (and became Tim Frog). The little story is gay in style and has colorful illustrations."

Hogner, Dorothy Childs Frogs And Polliwogs; illus. by Nils Hogner. Crowell 1956 68p illus. $2.75 (3-5) "Interestingly presented, accurate information about the physiological structure, habits, behavior, and species of frogs, with instructions for making and keeping a vivarium or aquarium. Covers much the same material as Zim's Frogs and Toads (entered below) in somewhat more textual detail, especially with regard to the different species, but in fewer pictures. Attractively illustrated and printed."

McClung, Robert M. Bufo: The Story Of A Toad; written and illus. by Robert M. McClung. Morrow 1954 40p illus. lib. bdg. $2.94 (1-4) "Bufo is one of the many creatures struggling for existence in the teeming life of pond and woods. The life cycle of a toad, told simply and accurately for young children."

-----Spotted Salamander; written and illus. by Robert M. Mc Clung. Morrow 1964 47p illus. baords $2.75 (2-5) The author describes "the physical appearance, mating habits, life cycle, and relatives of the spotted salamander and tells how to keep salamanders as pets."

Phleger, Fred Red Tag Comes Back; pictures by Arnold Lobel. Harper 1961 64p illus. (A Science I can read bk) $1.95 (1-3) "Aku, an Indian boy, named one of the baby salmon in the river, Red Tag. Soon Red Tag was big enough to start her journey to the sea. The story depicts the life cycle of the salmon. Eventually Red Tag comes home to lay her eggs and Aku recognizes her."

Zim, Herbert S. Fishes: A Guide To Fresh- And Salt-Water Species, by Herbert S. Zim and Hurst H. Shoemaker; illus. by James Gordon Irving. Golden Press 1957 160p illus. (A Golden Nature guide) $3.95 This pocket guide "deals with American fresh- and salt-water species. It tells how they may best be studied, identified, classified, photographed, collected, and even hunted by skin divers."

-----Frogs And Toads; illus. by Joy Buba. Morrow 1950 unp illus. map lib. bdg. $2.94 (3-5) "The life stories of frogs and toads, telling how and where they live, the various types of each, their characteristics, and how they compare. Explains how to keep amphibians as pets, and dispels some false beliefs about them."

Birds

Allen, Robert P. The Giant Golden Book Of Birds; an introduction to familiar and interesting birds of the world; designed and illus. by Arthur Singer. Consultant: Oliver L. Austin, Jr. Golden Press 1962 97p illus. $3.95 "The new text for this book has been written especially for young readers. . . Many of the illustrations . . first appeared in Birds of the world, an adult book, with text by Oliver L. Austin, Jr. published in 1961 by Golden Press. Descriptions habits, and illustrations of birds, listed by families."

Audubon, John James The Birds Of America; with a foreword and descriptive captions by William Vogt. Macmillan (N Y) 1953 (c1937) XXVI p 435 plates $12.50 "William Vogt has written an excellent introduction and a brief descriptive note for each plate. The names, both common and scientific, accompanying each plate, are those found in the 'Check-List' of the American ornithologists' union. Index is to common names only. Fine format. An excellent item for a gift to any library that lacks sufficient funds for purchase."

Blough, Glenn O. Bird Watchers And Bird Feeders; pictures by Jeanne Bendick, McGraw 1963 48p illus. (Whittlesey House publications) $2.95 (1-3) The author "discusses bird menus, bird feeders, bird migrations, bird landing, and the equipment needed by the beginning ornithologist. He tells what to look for and points the way to wonderful discoveries that can be made about birds."

Bosiger, E. A Bird Is Born, by E. Bosiger and J. M. Guilcher; photographs by E. Hoskins and R. H. Noailles. Sterling 1960 92p illus. (Sterling Nature ser) $2.95 (2-5) The first part of this book "traces, in lucid scientific text and in 111 X-ray and close-up photographs, the growth and development of a chicken embryo from the laying of the egg to the hatching of the chick. The second part describes the growth after birth of about a dozen species of birds including the curlew, tomtit, and owl."

Boulton, Rudyerd Traveling With The Birds; a book on bird migration; illus. by Walter Alois Weber. Donohue 1960 96p illus. lib. bdg. $3.50 (4-6) The author "gives much interesting information about birds of North America in these chapters that deal with their migration. The artist . . . is well known in his field."

Bronson, Wilfrid S. Starlings; written and illus. by Wilfrid S. Bronson. Harcourt 1948 unp illus. $3.50 (3-5) Mr. Bronson's "book of natural history for younger children describes the noisy birds which are becoming increasingly familiar in American cities and towns. Writing and drawing with his customary humor, he presents the starling in his good and bad aspects and shows him in many characteristic poses. The busy and bustling starlings do help us by eating weed seeds."

Conklin, Gladys *If I Were A Bird*; pictures by Artur Marokvia. Holiday 1965 unp illus. music $3.50 (1-3) This book about a boy imagining that he is different kinds of birds is designed "to help young children become aware of the pleasures of watching and especially of listening to birds. . . Twenty-seven birds are presented, each one in some typical activity in a place which it frequents. . . (There are) feather-collecting pages at the end of the book."

Darling, Louis *Penguins*. Morrow 1956 64p illus. map lib. bdg. $2.94 (3-6) "An entertaining, factual account of the life and habits of penguins. Begins with the annual spring migration and discusses mating and nesting habits as well as play and food getting activities. The various types of penguins . . . are presented as well as the features that make possible their existence in only one part of the world. The habits that make them so amusing to people are described in terms of their adaptation to their environment. The excellent drawings and pictures add value and appeal to the book."

Earle, Olive L. *Birds And Their Beaks*; written and illus. by Olive L. Earle. Morrow 1965 64p illus. $2.75 (5-7) The author discusses "birds, from the albatross to the woodpecker, and describes their beaks. She also includes . . . information about the markings, nesting, and feeding habits of each bird."

-----*Birds And Their Nests*. Morrow 1952 60p illus. lib. bdg. $2.94 (4-7) "Compactly written text and accurate drawings describe 42 birds and their nests --the appearance of the birds, where and how the nest is built, the eggs, and feeding of nestlings. Geographic nesting areas are noted, and for some birds the distinctive songs are given. Most of the birds presented are found in North America but a few from other countries are included."

-----*Birds Of The Crow Family*; written and illus. by Olive L. Earle. Morrow 1962 63p illus. $2.95 (3-5) "Crows, ravens, magpies, and jays make their presence known by their loud cries and their bold mischievous actions. But not everyone realizes that the noisy crows are among the most intelligent of all birds. . . The habits of these birds, the differences and similarities among them, and their personalities are described."

-----*Robins In The Garden*; illus by the author. Morrow 1953 63p illus. lib. bdg. $2.94 (1-3) "Interesting and easy-to-read, factual account of a pair of robins and their family--the arrival of the first robin in the garden on a cold March morning, his finding of a mate, the building of the nest, the hatching of the eggs, the care of the fledglings, and the migration in the fall. Excellent black-and-white drawings on every page; very large print."

-----*Thunder Wings*; the story of a ruffed grouse; written and illus. by Olive L. Earle. Hale 1951 46p illus. $1.74 (1-3) "A year in the life of a ruffed grouse. When little Ruff emerged from his egg, he had many things to learn; to stay near his mother; to stay away from foxes; how to drink dew; and how to fly. In the fall when he reached maturity he was on his own."

Eberle, Irmengarde Robins On The Window Sill; photographs by Myron E. Scott. Crowell 1958 42p illus. $3.50 (k-2) "Describes the life of a pair of robins from their first arrival in the spring through their mating, nesting and family life, to the time the fledglings leave the nest. . . Text is simple. The place of the robin in the scheme of nature is apparent without being underscored."

Fenton, Carroll Lane Birds And Their World, by Carroll Lane Fenton and Dorothy Constance Pallas; illus. by Carroll Lane Fenton. Day 1954 94p illus. maps $3.50 (4-6) An introduction to many different birds and to the lives they lead. Each chapter begins with the story of a kind, or species, that illustrates one particular subject. Then follows a discussion of the subject in relation to birds in general. "Excellent writing for children to read themselves as early as fourth grade and extremely useful for adults working with younger children. Fine black-and-white sketches by author."

Flack, Marjorie The Restless Robin. Houghton 1937 unp illus. music maps $3.50 (1-3) "Charming picture book in color describing the migration of Mr. Robin from a Georgia peach tree to a New Hampshire apple bough, and the family of three that Mr. and Mrs. Robin raised. Maps follow the course of Mr. Robin's travels and notations of bird music are given for the calls of various birds as they try to reassure the fledging Buffy Robin when he falls out of the nest."

Freschet, Berniece Young Eagle; illus by James Alexander. Scribner 1965 unp illus. $3.25 (3-5) "A description of the life cycle of the Golden Eagle of the United States--including accounts of his courage, his devotion to his young, his habits and his habitats."

Gans, Roma Birds Eat And Eat And Eat; illus. by Ed Emberley. Crowell 1963 unp illus. (Let's-read-and-find-out science bks) boards $2.75 (K-2) "How goldfinches, robins, chickadees, phoebes, and other common birds get their food and where they go to find it."

-----It's Nesting Time; illus. by Kazue Mizumura. Crowell 1964 unp illus. (Let's-read-and-find-out science bks) boards $2.75 (2-4) "A lot about nests. . . The author writes mainly of the materials various birds use in their nests and says very little about egg-laying and care of the young."

George, John L. Bubo, The Great Horned Owl, by John L. George and Jean George; illus. by Jean George. Dutton 1954 184p illus. (American woodland tales) $3.75 (4-6) "While this book emphasizes the great horned owl--and a magnificent creature he is--its cast includes many birds and animals native to North American forests. Mr. George's fine wash drawings continue to uphold the high standards of this . . . series."

Gilliard, E. Thomas *Living birds Of The World*; photographs by Eliot Porter (and others). Doubleday 1958 400p illus. $12.50 A "collection of bird photographs and a long and comprehensive text describing upwards of a thousand species of birds of the world, their habits and habitats. There are 217 full-color illustrations and 193 black and white photographs.

Goudey, Alice E. *Graywings*; illus. by Marie Nonnast. Scribner 1964 unp illus. $2.95 (2-4) "The life cycle and habits of the herring gull are described in the story of one particular gull and her mate."

Hausman, Leon A. *Field Book Of Eastern Birds*; with six plates containing ninety-four birds and bird heads in full color and over 400 drawings by Jacob Bates Abbott. Putman 1946 659p illus. $4.50 "An excellent field guide to all the birds east of the Mississippi. The drawings, coloured plates; compact descriptive notes and the general grouping and arrangement of the book make for ready identification. There is an excellent index including the common and scientific names of the individual birds and species."

Hawkinson. Lucy *City Birds*, by Lucy and John Hawkinson. Whitman, A 1957 unp illus. $2.50 (K-3) "Familiar birds of the cities are presented in word and picture in the easy-to-read book. The habits of sparrows, pigeons, starlings, robins, and other birds common to the city are told with sufficient flair to attract children to these everyday companions."

Hurd, Edith Thacher *Sandpipers*; illus. by Lucienne Bloch. Crowell 1961 unp illus. (Let's-read-and-find-out science bks) boards $2.95 (k-2) This book describes the sandpipers as they spend the summer on a northern beach and then fly south for the winter. It also tells how and when they return to the north a pair of sandpipers build a nest, how their sandpiper babies are hatched from the mother's eggs and how they grow during their first summer. "Of particular note are the illustrations, some of the freshest and loveliest of the year, which not only are accurate but also convey a sense of the wonder of nature and the beauty of sea and shore."

Kieran, John *An Instruction To Birds*; illus. by Don Eckelberry. Doubleday 1965 77p illus. $4.50 (5-7) A guide "in learning to know the more common birds of our lawns, our fields, our woods, our waterways and our ocean shores."

Lauber, Patricia *Junior Science Book Of Penguins*. Garrard 1963 64p illus. map (Junior science bks) $2.50 (2-4) "The author describes the habits and behavior of the penguins, who live only in the southern half of the world."

Lemmon, Robert *All About Birds*; illus. by Fritz Kredel. Random House 1955 142p illus. map (Allabout bks) $1.95 (4-6) The author has given an "overall story of birds to show their similarities and differences, their amazing habits and believe-it-or-not achievements. Throughout the book he tells of specific birds--how to identify them and study them as a scientist, and how to make friends with them as a neighbor."

McClung, Robert M. Honker: The Story Of A Wild Goose; illus. by Bob Hines. Morrow 1965 63p illus. map boards $2.75 (3-5) A "descriptive natural history of the Canadian goose that migrates northward from its winter feeding grounds in the South to nesting grounds in the Hudson Bay region of Canada. In the Fall, after the goslings have hatched and grown strong enough to fly, their southward migration begins. Honker is the great gander that leads the flocks. Along the migration routes are wildlife refuges of the U. S. Fish and Wildlife Service which afford feeding and nesting areas for these great birds. An important wildlife conservation story for all children."

-----Otus: The Story Of A Screech Owl; illus. by Lloyd Sandford. Morrow 1959 47p illus. $2.75 (1-3) "A life-cycle story told through Otus' experiences of mating and raising young Otus, and young Otus' attempts to fly, to capture food, to survive the menaces of natural enemies."

-----Ruby Throat: The Story Of A Humming Bird; written and illus. by Robert M. McClung. Morrow 1950 unp illus. lib. bdg. $2.94 (K-3) "Ruby Throat weighed less than a penny and yet he was strong enough and wise enough to fly from Central America across the Gulf of Mexico and up north to the apple orchard that was his summer home."

-----Vulcan: The Story Of A Bald Eagle; illus. by Lloyd Sandford. Morrow 1955 63p illus. lib. bdg. $2.94 (3-5) "As a young eagle, Vulcan lived and hunted alone in his native northern wilderness. Then he found a mate and the two eagles built their nest in a giant oak, returning there each year to raise their brood. Vulcan's triumph over the disaster of a forest fire forms the climax of this life-cycle story."

-----Whooping Crane; illus by Lloyd Sandford. Morrow 1959 63p illus. lib bdg. $2.94 (2-4) "A wealth of information on the habits and migratory activities of the (nearly extinct) whooping crane."

Ozone, Lucy Winter Tree Birds, by Lucy Ozone and John Hawkinson. Whitman, A. 1956 unp illus. $2.50 (k-2) "About the five (species of) birds that remain with us when summer birds migrate elsewhere. In looking for their food, these birds--the Chickadee, Titmouse, Woodpecker, Nuthatch and Brown Creeper--actually help our trees to stay strong and vigorous."

Peterson, Roger Tory A Field Guide To The Birds; giving field marks of all species found east of the Rockies; text and illus. by

Roger Tory Peterson. 2d rev. and enl. ed. Sponsored by National Audubon Society. Houghton 1947 XXIV, 290p illus map $4.95 "An orginal, authoritative and useful guide . . . described to help in identifying live birds at a distance. . . The text gives field marks, such as range, habits, manner of flight, etc., that can not be pictured. In addition it mentions birds that might in any instance be confused with a given species."

-----*A Field Guide To Western Birds*. . . Text and illus. by Roger Tory Peterson. 2d ed. rev. and enl. Sponsored by the National Wildlife Federation. Houghton 1961 XXVI, 366p illus. map (The Peterson Field guide ser) $4.95 "Field marks of all species found in North America west of the 100th meridian, with section on the birds of the Hawaiian Islands."

-----*How To Know The Birds;* an introduction to bird recognition. 2d ed. . . Endorsed by The National Audubon Society. Houghton 1962 (c1957) 168p illus. $3.50 "Bird recognition without color or field glasses. All the tricks of quick and easy identification. Excellent for both beginner and advanced bird students."

Pettit, Mary P. *My Hobby Is Bird Watching.* Childrens Press (1958 c1955) 128p illus maps $3.95 (4-7) "A practical guide which presents bird watching as an adventurous and rewarding outdoor hobby and offers advice on how to get started as a bird-watcher, how to identify and attract birds, where to find them, and how to enjoy the hobby. Includes information on general classification of birds, bird-watching equipment and techniques, bird houses, feeders, and backyard sanctuaries, bird photography, location of bird refugees in national parks and monuments, zoological gardens housing collections of birds, state agencies administering wild-refugees, publications about birds, and bird clubs. Illustrated with photographs and drawings."

Pouch, Richard H. *Audubon Bird Guide: Small Land Birds Of Eastern & Central North American From Southern Texas To Central Greenland.* With illus. in color of every species. Sponsored by National Audubon Society. Doubleday 1949 XLII, 312p illus. maps $4.50 "This pocket-sized book is an illustrated field guide for 275 species of land birds which inhabit eastern North America. There are 48 full-page color plates illustrating more than 400 different bird plumages; also a full discussion of each of the species, describing the significant points of identification, voice, range, nesting and food habits, and methods by which birds may be attracted.'

-----*Audubon Water Bird Guide*. . . Doubleday 1951 XXVII 352p illus maps $4.95 "Covers such significant points as identification, over-all range, mating habits, nesting and parts of the country in which each bird is found."

-----*Audubon Western Bird Guide*. . . Doubleday 1957 XXXVI, 316p illus. $4.95 "Land water, and game birds; western North

America, including Alaska, from Mexico to Bering Strait and the Arctic Ocean. A pocket guide covering such significant points as identification, habits, voice, nest and range. The table of contents lists the species according to families. Includes a bibliography and a list of abbreviations.

Ripper, Charles L. Ground Birds; written and illus. by Charles L. Ripper. Morrow 1960 64p illus lib. bdg. $2.78 (3-5) "A number of birds that have become adapted to life close to the ground are described here. Among them are the woodcock, the ovenbird, the snow bunting, the whippoorwill, and the bobwhite or quail. Information about feeding habits, nesting, and range is given."

-----Hawks: written and illus. by Charles L. Ripper. Morrow 1956 61p illus. lib. bdg. $2.94 (4-6) "Beginning with the use of hawks in legend and as symbols, throughout time and the world, the author then discusses the physiology, habits and value of hawks to mankind. The material is presented through simply written, interesting text and attractive, informative illustrations. The emphasis is given to the protection of hawks as valuable aid to farmers."

-----Swallows; written and illus. by Charles L. Ripper. Morrow 1964 64p illus. boards $2.75 (3-6) The author discusses the seven most common species of swallows--barn swallow, cliff swallow, bank swallow, rough-winged swallow, tree swallow, violet-green swallow, purple martin and "their feeding, nesting, breeding habits as well as . . . the still puzzling phenomenon of migration."

Schwartz, Elizabeth Bobwhite, From Egg To Chick, by Elizabeth and Charles Schwartz. Illus. by Charles Schwartz. Holiday 1959 48p illus. (Life-cycle stories) lib. bdg. $2.75 (1-4) "The story of the development of the bobwhite quail from embryo to adult with descriptions of its life at different stages of development."

Sears, Paul McCutcheon Barn Swallow; by Walter Ferguson. Holiday 1955 45p illus. (Life-cycle story) $2.75 (2-5) An "account of the life of a barn swallow fron the time it first learns to fly through its first migration and mating season. As in his other nature books, the author gives the bird individuality without resorting to personification, and tells a story that makes interesting as well as informative reading."

Selsam, Millicent E. Tony's Birds; illus. by Kurt Werth. Harper 1961 64p illus. (A science I can read bk) (K-2) "Birdwatching is the subject. With the help of his father, Tony learns to use binoculars and a bird guidebook to find and identify birds. Two- and three-color pictures and clear print make an attractive easy-to-read book which make birdwatching an interesting activity. The fact that Tony and his father are

Negroes in the pictures make one suddenly aware of the almost universal assumption by illustrators that characters are 'always' white unless the author is writing specifically about Negroes, Chinese, Indians, or other colored people. This little book is a welcome departure from this custom."

Simon, Hilda Wonders Of Hummingbirds; illus. by the author. Dodd 1964 63p illus. maps (Dodd, Mead Wonder bks) lib. bdg. $2.79 (3-6) "Feeding habits, nest building, range and migrations of individual species are covered, and hummingbirds of the United States and Canada are given special attention."

Sprunt, Alexander Gamebirds: A Guide To North American Species And Their Habits, by Alexander Sprunt IV and Herbert S. Zim. Golden Press 1961 160p illus. maps (A Golden Nature guide) $2.99 This guide deals "with the various types of gamebirds: waterfowl, shorebirds, rails, and many other. Scientific and common names of each bird, its size, facts on nesting, feeding habits and migratory patterns are given. Included are detailed drawings of special markings which aid identification."

Webb, Addison Birds In Their Homes; pictures by Sabra Mallett Kimball. Garden City bks. 1947 66p illus. $3.50 (3-6) In this book are described fifty-four birds of city, country, and garden--how they live, build their nests, and care for their young. The grouping is by type of nest built. "Well designed and executed by two bird authorities, it can be recommended for the beauty of its (colored) illustrations and the simplicity of its text."

Welty, Susan F. Birds With Bracelets; the story of birdbanding; illus. by John Kaufmann. Prentice-Hall 1965 72p illus. maps (Prentice-Hall Junior research bks) $3.50 (4-6) "The practice of marking individual birds for identification is traced to its origins more than 2000 years ago and the text and illustrations show how banding is done and what purposes it serves. Maps show routes of migration of several species. The author describes how one can help in the bird banding program, both by securing a license to band birds, and by reporting on banded birds which have been recovered."

Williamson, Margaret The First Book Of Birds; written and illus. by Margaret Williamson. Watts, F. 1951 69p illus. $1.95 (3-6) "A simply written text, with marginal diagrams and bird pictures on each page, answers many questions about bird anatomy--feathers, wings, beaks, etc.--and about the life cycle. . . For stimulating interest in bird watching in clubs or at home."

Wong, Herbert H. Ducks, Geese, And Swans; illus. by William D. Berry consultants: A. Starker Leopold (and) Matthew Vessel. Lane Bk. Co. 1960 65p illus. maps (Sunset junior bk) $3.50 (4-6) "In the opening chapters this book explains the difference between these waterfowl and other waterbirds, it describes their characteristics, appearance, and their importance to man from Indian days to the present. In later chapters each of the three groups is treated generally--as to habits, range and migration."

Zim, Herbert S. Birds: A Guide To The Most Familiar American Birds, by Herbert S. Zim and Ira N. Gabrielson; illus. by James Gordon Irving; sponsored by The Wildlife Management Institute. (Rev. ed) Golden Press 1956 160p illus. maps (A Golden Nature guide) $2.99 "The basic data for a real understanding of bird lore (is presented) in this guide. . . The book also provides for the identification of related species. It includes range maps and a wealth of facts telling both layman and student, young people and adults, where and how to look for birds."

-----Ostriches; illus. by Russell Francis Peterson. Morrow 1958 64p illus. $2.95 (3-6) "After discussing briefly differences between birds and other vertebrates, and also the difference between flying birds and the flightless ratite group (of which the ostrich is a member), the habits and the history of ostriches are examined. Other related birds are described and some of the popular misconceptions about the behavior of ostriches are refuted."

-----Owls; illus. by James Gordon Irving. Morrow 1950 unp map lib. bdg. $2.94 (3-6) The author describes "everything about owls including general distribution, migration, breeding and diet and an interesting section, dealing with the physiology of owls' eyes and the influence of the owl's eye structure and extra-ordinary neck rotation."

Reptiles

Barker, Will Familiar Reptiles And Amphibians Of America; drawings by John Cameron Yrizarry. Harper 1964 220p illus. $5.95 Companion volume to: Familiar animals of America, class 591.97 and Familiar insects of America, class 595.7 "An introductory guide to some of the most common and widely distributed, or well-known, snakes, lizards, turtles, crocodilians, salamanders, and frogs and toads in the U. S. Barker tells their life history and their role in the plant and animal community and describes their appearance."

Bevans, Michael H. The Book Of Reptiles And Amphibians; written and illus. by Michael H. Bevans. Garden City Bks. 1956 63p illus. boards $3.50 "A hundred or more species of snakes, lizards, turtles, frogs, toads, and salamanders indigenous to the U. S. are pictured in handsome, colored illustrations, and their distinctive characteristics, behavior, and habitats (are) described. . . Unfortunately for libraries textual as well as pictorial material is printed on the end papers."

Bronson, Wilfrid S. Turtles; written and illus. by Wilfrid S. Bronson. Harcourt 1945 unp illus. $2.75 (3-6) A book about "the world of turtles. . .(with cartoon-like) imaginative illustrations. Techniques for the study of turtles, such as 'age rings' are explained together with directions for the care of turtles as pets. Tortoises, terrapins, and sea turtles are all discussed."

Carr, Archie The Reptiles, by Archie Carr and the editors of Life, Time, Inc. 1963 192p illus. map (Life Nature lib) boards $3.95 "A biologist surveys the 300 million year history of reptiles. The author traces the rise to dominance and subsequent dwindling to the few surviviors found today. Chapters cover: The business of eating; The business of living; Return to the water; The miraculous shelled egg; Growing troubles with man; A dubious future."

Collins, Henry Hill Junior Science Book Of Turtles; illus. by Matthew Kalmenoff. Garrard 1962 64p illus. (Junior science bks) $1.98 (2-5) This book tells "about turtle eggs and turtle babies, about the Alligator Snapping Turtle that may weigh as much as 200 pounds, abou the Gaint Tortoise that sometimes lives to be 100 years old and about the tiny Red-Eared Turtle that makes a pet everybody enjoys."

Conant, Roger A Field Guide To Reptiles And Amphibians: Of The United States And Canada East Of The 100th Meridian; illus. by Isabelle Hunt Conant. Houghton 1958 366p illus. maps (The Peterson Field guide ser) $4.95 Nearly "every species of frog, toad, salamander, snake, lizard, turtle, alligator and crocodile found in eastern North America is cataloged with over 1,000 illustrations, more than 400 of them in full color. Identification characteristics, habitat, ecology, and natural history of each species are noted, and there is advice on the adoption of reptiles and amphibians as pets."

Cruickshank, Helen Gere Wonders Of The Reptile World; illus. by Lon Ellis. Dodd 1959 63p illus. (Dodd, Mead Wonder bks) lib. bdg. $3.00 (4-7) "Not a book for identifying reptiles but a picture of their past history and present types. Nearly one-third deals with fossils and dinosaur history followed by a general description of the four orders of living reptiles: crocodilians, beakheads (living fossils), turtles, lizards, and snakes. . . Small print."

Darby, Gene What Is A Turtle; pictures--Lucy and John Hawkinson. Benefic Press 1959 48p illus. $1.80 (1-3) This book "tells how turtles move about, what they eat, where and how many eggs they lay, and the different environments in which they are found and how they hibernate."

Darling, Lois Turtles, by Lois and Louis Darling. Morrow 1962 64p illus. lib. bdg. $2.94 (3-5) "In this book the authors discuss turtle evolution and structure, the way different kinds of turtles live, and their care as pets. They point out that these unique armored reptiles are much the same as their ancestors that shared the earth with the dinosaur. They describe also the gentle box turtle, the huge Galapagos tortoise, and the diamondback terrapin."

Ditmars, Raymond L. Reptiles Of The World: The Crocodilians, Lizards, Snakes, Turtles And Tortoises Of The Eastern And Western Hemispheres. New rev. ed. . . Macmillan (N Y) 1936 (c1933) XX, 321p front 89 plates $7.50 "The scope of the book prevents it from being. . . primarily a volume intended to be used for identification purposes, it is here designed to consider the class of reptiles as a whole and in a general way. But for purposes of identification the profuse illustrations cannot fail to be serviceable in a high degree."

Earle, Olive L. Strange Lizards; written and illus. by Olive L. Earle. Morrow 1964 61p illus. $2.75 (3-6) The author "has selected the most unusual lizards, and in this book describes their habits and characteristics."

Fenton, Carroll Lane Reptiles And Their World, by Carroll Lane Fenton and Dorothy Constance Pallas; illus. by Carroll Lane Fenton. Day 1961 126p illus. $3.50 (4-7) "Contents: Cold bodies and scrales; Foods for reptiles; Sight and other senses; How reptiles travel; Protection from danger; Finding mates, Eggs and young one; Growing up and growing old; Winter and summer rests; Where reptiles live; Reptiles of dry regions; Reptile at sea; Useful reptiles."

Harris, Louise Dyer Slim Green, by Louise Dyer Harris and Norman Dyer Harris; illus, by Robert Candy. Little 1955 52p illus. $2.75 (2-4) "A simple description of a green snake's habits and behavior during the changing seasons, and of its relations with the other small inhabitants of the meadow--skunks, marsh hawks, insects and different kinds of snakes."

Hecht, Bessie M. All About Snakes; illus. by Rudolf Freund. Random House 1956 143p illus. (Allabout bks) $1.95 (5-7) The author "tells the true story of snakes and their ways. She also recalls some of her own remarkable experiences with many kinds of snakes . . . collecting snakes in the West Indies, Florida, New York New Jersey and Canada. . .milking venom from moccasin snakes. . . raising and studying boas, garter snakes, blind snakes, fox snakes and many others."

Hoke, John The First Book Of Snakes; pictures by Paul Wenck. Watts, F. 1952 67p illus. $1.95 (3-5) "All kinds of fascinating information about snakes--their origin, characteristics, habits, kinds, habitats, enemies, production of young, poisonous snakes, snake poisoning, snakes as pets. A final section dispels some myths about snakes. . . Useful."

Holling, Holling Clancy Minn Of The Mississippi; written and illus. by Holling Clancy Holling. Houghton 1951 85p illus. maps $3.75 (5-7) "In telling the story of Minn, a snapping turtle, the author touches on the geography, history, geology and climate of the Mississippi River. . . Illustrated with full page pictures in color and many marginal pencil drawings."

McClung, Robert M. Buzztail: The Story Of A Rattlesnake; written and illus. by Robert M. McClung. Morrow 1958 64p illus. lib. bdg. $2.94 (3-6) "This account of one year in the life of

Bruzztail conveys a wealth of information about the timber rattlesnake whose three-quarter-inch fangs stab suddenly, like a hypodermic needle. In this story the startled Buzztail strikes a careless farm boy, and all the steps of taking care of a snake bite are described."

Zim, Herbert S. Alligators And Crocodiles; illus. by James Gordon Irving. Morrow 1952 62p illus. $2.95 (4-7) "How they swin and breathe, where they live, the laying and hatching of their eggs, what they eat and how they get it, are only a few of the facts about alligators and crocodiles told and pictured here."

-----Reptiles And Amphibians: A Guide To Familiar American Species; by Herbert S. Zim and Hobart M. Smith; illus. by James Gordon Irving; sponsored by The Wildlife Management Institute. (Rev. ed) Golden Press 1956 160p illus. maps (A Golden Nature guide) $2.99 "Over 100 common reptiles and amphibians are listed in this excellent handbook. Approximately one page is devoted to each species; a color illustration, a map showing distribution in North America, approximate size, physical markings, and diet are are given for all animals."

-----Snakes; illus. by James Gordon Irving Morrow 1949 unp illus. maps $2.95 (4-7) "Confined to North American snakes, this book gives great detail on markings, anatomy, feeding habits, identification, handling. Black-and-white drawings by James Fordon Irving are correct and so well used on each page of text that without them much pleasure and information would be lost. Excellent paper and type. Important for school, club and museum libraries."

Mammals

Adamson, Joy Elsa. . . Patheon Bks. 1961 unp illus. boards $2.95 (4-6) "The true story of a lioness who was brought up from cubhood by Joy Adamson and her husband, a senior game warden; they taught her to stalk and kill for herself so that she could be set free into the African Jungle."

Andrews, Roy Chapman All About Whales; illus. by Thomas W. Voter. Random House 1954 148p illus. (Allabout bks) $1.95 (4-7) "Drawing partly on his own experiences during eight years of studying whales for the American Museum of Natural History in New York, and partly on historical accounts of experiences of whalers from earliest to more recent times, the author describes the major type of whales, gives as much as is known of their habits, and tells how and for what purposes they are hunted by man. . .A more detailed text than that of Zim. "The Great Whales" entered in this class) but the illustrations are less informative than those of the Zim, book"

Brauner, Theodore Silent Visitor. Atheneum Pubs. 1962 57p illus. $3.00 (3-5) "While on a photographic assignment in Israel, the author noticed bananas missing from his fruit basket and set up his camera, to take a picture of the thief--a bat. This is a series of photographs of his nightly visitors supplemented with a general text on the habits of these unusual creatures."

Bridges, William *Wild Animals Of The World: Animal Portraits* by Mary Baker; introduction by Roy Chapman Andrews. Doubleday 1957 (c1948) 273p illus. $4.95 Representatives of every species of wild animal are described and illustrated with 252 pictures, 100 in full color. Arranged alphabetically by popular name of animal. "Very attractive, lifelike illustrations, most of them in color, of animals commonly seen in zoos, with a half-page description accompanying each picture."

Bronson, Wilfrid S. *Coyotes* (ki' yotes or ki-yo'tays) written and illus. by Wilfrid S. Bronson. Harcourt 1946 unp illus. $2.75 (2-5) "Mr. Bronson's agreeable method of stimulating the curiosity and arousing the interest of young children in natural science has long been proved. Here, in large type, with many detailed and precise pictures, he describes the appearance and habits of the 'smart kind of wild dog,' so familiary mentioned in stories of the West. Not all writers are as sympathetic toward the coyote as Wilfrid Bronson, so it is pleasant to learn in simple language what are some of the good points about the sharp-nosed dog who does not want to be tame."

-----*Horns And Antlers*; illus. by the author. Harcourt 1942 143p ill $3.95 (4-6) "All about the deer and antelopes of North America in detailed picture and story. Valuable for reference and general reading, the book tells how best to see deer and to recognize their tracks, and how to read the signs where they have been, as well as much about their appearance and habits."

Buff, Mary *Dash & Dart* by Mary & Conrad Buff. Viking 1942 73p illus. $3.25 (K-3) "As a picture book this is very beautiful. Soft brown pictures of deer throughout the book and four double spreads in color, showing the four seasons, would in themselves make the book one to be remembered. In short, rhythmic sentences adapted for reading aloud, perhaps at bedtime, two little twin deer are followed from their birth in the spring to their first snowstorm. The print, too is clear and beautiful making this an especially lovely book."

-----*Forest Folk*, by Mary & Conrad Buff. Viking 1962 64p illus boards $3.00 (K-3) Describes the life of several forest creatures, mainly deer, through the changing seasons. Attention is focused on the fight for leadership of the deer herd between Old Horn and Dash, now a three-year-old buck.

-----*Hurry, Shurry & Flurry,* by Mary and Conrad Buff. Viking 1954 71p illus. $3.50 "Three small squirrels grow through the seasons--until Flurry is snatched by a hawk and Hurry and Skurry find their own mates. Dash is here, too, a handsome buck, now king of the forest. Birds, bears, a porcupine, mountain lion and other creatures of the wood move among the ferns and trees in soft brown-toned drawings that again have distinctive beauty and atmosphere. The story is related simply in short lines that have the rhythmic quality of verse and make easy reading for beginners."

Burger Carl All About Elephants; illus. with drawings by the author and with photographs; foreword by Fairfield Osborn. Random House 1965 132p illus. (Allabout bks) The author surveys "the history and habits of our largest land animal. He includes description of the capture of a wild herd in Assam and stories of a wild elephant, a working elephant, and a show elephant, and several chapters of miscellaneous information about this amazing animal. Incorporated with an excellent format is an unusally successful combination of photographs and drawings. Good bibliography and index."

Burt, William Henry A Field Guide To The Mammals. . . Text and maps by William Henry Burt. Illus. by Richard Philip Grossenheider. 2d ed. rev. and enl. Sponsored by the National Audubon Society and National Wildlife Federation. Houghton 1964 XXIII, 284p illus. (The Peterson Field guide ser) $4.95 This "handbook provides information on 378 species to be found in North America and surrounding waters. Contains up-to-date maps showing present distribution, beautiful and detailed color plates of each animal, and many other aids to (identification). . . Each description also gives the animal's habits."

Catherall, Authur Orphan Otter; illus. by Lloyd Sandford. Harcourt 1963 (c1962) 127p illus. $2.95 (3-5) "An orphaned otter's fight for survival against hunger, human and animal enemies, fire, and the rigors of winter during its first year. Not exceptional but a pleasant, easily read story which pictures with some vividness the Canadian wilderness and the habits of otters."

Cook, Joseph J. Killer Whale! By Joseph J. Cook and William L. Wisner; illus with photographs and drawings. Dodd 1963 64p illus. $3.00 (4-6) The authors describe the killer whale, concentrating on his "attacks on fish, fellow mammals and man, tracing recorded onslaughts from the Roman historian, Pliny, to the present time. . . Pictures include photographs of a whale that terrorized a fishing boat off Long Island."

Crosby, Alexander L. Junior Science Book Of Beavers; illus by Jean Zallinger. Garrard 1960 65p illus. (Junior science bks) $1.98 (2-4) "Tells how nature's engineers build their homes, dams, and canals, and explains the amazing adaptations which make possible these feats. The beaver's importance in conserving soil and in providing homes for other animals also is pointed out. Attractive drawings of the animal and his handiwork supplement the clear and authoritative text."

Darling, Louis Kangaroos And Other Animals With Pockets; written and illus. by Louis Darling. Morrow 1958 64p illus. maps lib. bdg. $2.94 (3-6) "A compact and informative book about marsupial mammals of the world; their evolution from a common ancestor and their isolation on the Austrailian continent is explained. An unusual feature in this book is the use of paired drawings of marsupial animals and their comparable forms among the pouchless mammals. The distinguishing features and habits of the red kangaroo are described in detail as an example of the marsupial's life."

Darling, Louis Seals And Walruses. Morrow 1955 63p illus. map lib. bdg. $2.94 (3-6) "The habits and behavior of many species of seals and walruses, where they live, and how they are hunted and protected today. Attractive in presentation and format."

Earle, Olive L. Camels And Llamas, written and illus. by Olive L. Earle Morrow 1961 63p illus. lib. bdg. $2.94 (3-5) "In small space, amply filled with lively, explicit drawings in soft pencil, many interesting facts are told about camels of one and two humps and about their cousins, the llamas, alpacas, guanacos, and vicunas. Discussion of their prehistoric existence, when they were as small as hares, and of their various usefulness today carries the feel of fresh knowledge and should intrigue young readers."

------Paws, Hoofs, And Flippers; illus. by the author. Morrow 1954 192p illus lib. bdg. $3.00 (4-7) "An easily read, informative book describing the distinguishing characteristics, habitats, habits and behavior of representatives of the different orders of mammals; grouped according to types of feet--claws, hoofs, hoofs and claws, flippers, and nails. Illustrated with many drawings, most of which are excellent."

-----Squirrels In The Garden; written and illus. by Olive L. Earle. Morrow 1963 63p illus. lib. bdg. $2.94 (2-5) "The physical characteristics, habits, and behavior of the gray squirrel are accurately described in a lively narrative which traces the life of one particular squirrel from birth to his finding of a mate. The excellent line drawings on almost every page give evidence of the author-illustrator's close observation of her subject."

Eberle, Irmengarde Fawn In The Woods; photographs by Lilo Hess Crowell 1962 42p illus. $3.50 (k-2) "Charming photographs show a fawn from birth through her first year; most of the text describes the ways in which the mother doe teaches and protects the fawn. The text is written in a simple and straight-forward style: print is large, photographs clear."

Goudey, Alice E. Here Come The Bears! Illus. by Garry MacKenzie. Scribner 1954 92p illus. lib. bdg. $3.12 (1-3) True to life storis about the habits and habitats of each of these families of American bears; grizzly, Polar, Alaskan brown and black. "To a story full of facts simply presented with enough plot interest to hold a small child's attention, are added many delightful illustrations."

-----Here Come The Beavers! Illus. by Garry Mackenzie. Scribner 1957 94p illus. lib. bdg. $3.12 (1-3) "The life story of a pair of beavers in the Adirondacks where their dam-building is not always appreciated. There is also an interesting chapter on the use of beavers in New Mexico where they have actually been parachuted from a plane to build dams."

Goudey, Alice E. Here Come The Cottontails! Illus. by Garry MacKenzie. Scribner 1965 93p illus. $3.25 (1-3) This book "is divided into three parts: the life cycle of a family of cottontails; a short chapter giving the characteristics of the jack rabbit, what he eats, habitat, how he differs from the cottontail, other desert animals of Arizona; lastly, brief information about various American kinds of cottontails and hares."

-----Here Come The Deer! Illus. by Garry MacKenzie. Scribner 1955 92p illus. lib. bdg. $3.12 (1-3) "These true stories about deer, elk and caribou follow the life cycle of these animal families through their first year of life in their natural habitat."

-----Here Come The Dolphins! Illus. by Garry Mackenzie. Scribner 1961 94p illus. $3.25 (1-3) "Little Bottlenose is an inquistive dolphin who must learn at an early age how to protect his place in the herd, how to communicate with squeaks and whistles and how to play games with imagination and spirit. Mrs. Goudey presents some information on the dolphin and tells about some interviewing tests given to them."

-----Here Come The Elephants! Illus by Garry MacKenzie. Scribner 1955 92p illus. lib. bdg. $3.12 (1-3) "In the same seminarrative style and attractive format as that of the author's earlier books on bears and deer, this easy-to-read little book presents interesting facts about the behavior and habitats of the African and Asian elephants. The life of the African elephant from birth to death and the Indian elephant's capture and training for work are described, and the two species compared."

-----Here Come The Lions! Pictures by Garry MacKenzie. Scribner 1956 94p illus. lib. bdg. $3.12 (1-3) "In easy reading, interesting style the author presents the African lion and the puma in their native settings and at their normal activities of rearing and training young, acquiring food, and protecting themselves. . . Some relatives of lions and pumas are (also) identified and pictured."

-----Here Come The Raccoons! Illus. by Garry MacKenzie. Scribner 1959 94p illus. lib. bdg. $3.12 (1-3) "This book takes Little Prowler from his first efforts to leave his home in a tree hollow, through the long first year of his early education in making his own way, fleeing from danger, hibernating through the winter, and the next season finding his mate. At the end Prowler's cousins elsewhere are introduced--pandas, coatis, cacomisties, and kinkajous."

-----Here Come The Seals! Illus. by Garry MacKenzie. Scribner 1957 93p illus. lib. bdg. $3.12 (1-3) "A detailed and accurate account of the life cycles and natural habitats of fur seals and harp seals, with brief accounts of some of their relatives, such as the harbor seal, sea elephant, and sea lion. Simple narrative style is well suited to the reading ability of young naturalists in

Goudey, Alice E. Continued
(the lower) grades. . . Illustrations are decorative and lively and add much to the book."

-----Here Come The Squirrels! Illus. by Garry MacKenzie. Scribner 1962 93p illus. lib. bdg. $3.12 (1-3) This book about Chip, Red Squirrel, and others describes many species of squirrels, their habits, and homes, and their close relatives--chipmunks, woodchucks, and gophers. Illustrated in black and white and woodland color.

Hess, Lilo Rabbits In The Meadow; story and photographs by Lilo Hess. Crowell 1963 42p illus. $3.50 (K-2) "A read-aloud book that describes, with no fictionalization, the life cycle of the cottontail; the text is fitted to a series of photographs of a doe and her litter of three. The photographs are good close-ups with just a few pictures that are fuzzy; they are rather repetitive. The text is straightforward in tone and low-keyed: informative, a bit dry."

Hogner, Dorothy Childs The Animal Book: American Mammals North Of Mexico, by Dorothy Childs Hogner and Nils Hogner. Walck, H.Z. (1958 c1942) 223p illus. $5.75 "A handbook of mammals native to North America, arranged by order, family, and genus, giving both scientific and common names. The text, stimulating and direct, describes the appearance, habits and behavior, habitat, distribution, and economic value of approximately 170 animals. Appendixes: Immigrants from foreign shores, and classification key. Well indexed. A large book with fine black and white drawings."

Hoke, Helen The First Book Of Tropical Mammals; pictures by Helene Carter. Watts, F. 1958 60p illus. lib. bdg. $2.65 (4-6) "Describes many curious inhabitants of the jungles and plains of South America, Africa, India, Ceylon, and Malaysia. The text ranges from such well-known creatures as the gorilla to the unusual bingturong."

Kohn, Bernice Koalas; pictures by Gail Haley. Prentice Hall 1965 unp illus. $3.50 (K-3) A "factual story designed to help children understand the environmental habits of Australian marsupials--the koalas. The pictures are delightful with a refreshing distinctiveness expertly and humorously composed. Climbing koalas, yawning koalas, playful koalas, frightened and hungry koalas are attractively portrayed in a consistent color scheme of green, brown, and gold."

Lauber, Patrica The Friendly Dolphins; illus. with photographs; with drawings by Jean Simpson and with diagrams by Charles Gottlieb. Random House 1963 81p illus. (Easy-to-read science lib) boards $1.95 (3-5) This book begins with tales of dolphins and then tells "all about the bottle-nosed dolphin--characteristics, intelligence, personality, and importance to science."

Lemmon, Robert S. All About Monkeys; illus. by Jean Zallinger. Random House 1958 144p illus. (Allabout bks) $1.95 (4-6) In this book the author introduces the reader to monkey land and to some of the interesting types of monkeys such as: "Dog Monkeys with dog-like jaws, Military Monkeys that march like soldiers, Crab-Eaters that live near the water and fish for their food, and the grim-faced Howler Monkeys whose roar is more terrifying than that of the African lion."

-----Junior Science Book Of Big Cats; illus. by Jean Zallinger. Garrard 1962 64p illus. (Junior science bks) $1.98 (2-4) "The history of wild and tame cats and their common features (teeth, claws, paws, eyes, and hunting methods) accompany the individual portraits of the largest and most exciting felines; lions, tigers, cheetahs, cougars, lynxes, jaguars, and leopards."

Liers, Emil E. A Beaver's Story; illus. by Ray Sherin. Viking 1958 192p illus. $3.00 (4-7) "Beaver colonies, their development, habitat, games, hardships are here presented in a moving portrayal of nature life in America's north woods, as told from the viewpoint of a typical beaver family."

-----A Black Bear's Story; illus. by Ray Sherin. Viking 1962 192p illus. $3.00 (4-7) Against the background of the Minnesota woodland, in its seasonal variations, the author follows the adventures of a bear family "through a year and a half of the cubs' experiences as they learn the rules of good bear behavior and become familiar with the ways of their forest neighbors--moose, deer, otters, foxes, coyotes, and other animals and birds."

-----An Otter's Story; illus. by Tony Palazzo. Viking 1953 191p illus. $3.75 (4-7) "This is a true story of the lives of two otters and their parents and cubs. Each incident is based on actual facts and really happened at one time or another to otters I have known. Ottiga and Beauty lived in territory I have trapped and hunted in and anyone who wants to can follow their actual journeys, along the waterways of Michigan and Wisconsin."

McClung, Robert M. Major: The Story Of A Black Bear; written and illus. by Robert M. McClung. Morrow 1956 64p illus. lib. bdg. $2.94 (2-5) An "account of the growth of Major from a tumbling black cub to a full-grown animal. Major is very curious and is involved in all sorts of escapades but from each experience he learns something that will enable him to live safely."

-----Possum; written and illus. by Robert M. McClung. Morrow 1963 47p illus. board $2.95 (1-4) In this life-cycle story, Possum leaves her mother to face the dangers of setting up her own home. She forages for food, avoids her animal enemies, "hibernates in the winter, mates in the spring, and finally raises a family--building a nest and nursing her babies just as her mother did before her."

McClung Robert M. Screamer: Last Of The Eastern Panthers; illus. by Lloyd Sandford. Morrow 1964 64p illus. $2.75 (3-6) "This is the story of the life and struggles of Screamer, an Eastern panther of 1885, as he stalked prey, fought, and sought a mate."

-----Spike: The Story Of A Whitetail Deer; written and illus. by Robert M. McClung. Morrow 1952 63p illus. lib. bdg. $2.94 (1-3) "During his first year, Spike the whitetail deer learns something of the friends and enemies who live in the big woods that stretches half way up the mountain slopes. A nature book for young readers."

-----Stripe: The Story Of A Chipmunk; written and illus. by Robert M. McClung. Morrow 1951 unp illus. lib. bdg. $2.94 (1-4) Stripe was born in the spring in a snug nest two feet underground, for he was a baby chipmunk, not much bigger than a bumblebee. By the following spring he was grown-up. The adventures of the intervening months are told in an interesting fashion with many black and white illustrations. Large easy-to-read type. "This one gives a true picture of the beauties and dangers of a chipmunks's world. Informative appealing pictures in soft browns and greens."

-----Whitefoot: The Story Of A Wood Mouse; written and illus. by Robert M. McClung. Morrow 1961 48p illus. lib. bdg. $2.94 (1-4) The story of a year in the life of Whitefoot, a wood mouse as she raises her family, helps them to find food, teaches them to know which animals are their friends and which their enemies, and out-smarts a shrew. "Information about nesting habits, food, and habitat are woven smoothly into the writing, with no sentimentality and no personalizing."

Mc Cracken, Harold The Biggest Bear On Earth; drawings by Paul Bransom. Lippincott 1943 113p illus. $4.50 (4-7) "This story of Little Roughneck, from the morning he emerges with his mother from the winter den until he grows to be 'the greatest bear on earth' is based on the author's first-hand study of the Alaskan Brown Bears, who live on the Aleutian Peninsula. Beautifully illustrated with lithographs."

Mason, George F. The Bear Family; written and illus. by George F. Mason. Morrow 1960 96p illus. maps lib. bdg. $2.94 (4-6) "Separate sections of this . . . book are devoted to the American black bear, the grizzly bear, the O Kasis brown bear, the polar bear, bears in other lands, and the origin of the bear family. In each section Mr. Mason describes the bear's anatomy and appearance, its habits, and where it lives."

-----The Deer Family; written and illus. by George F. Mason. Morrow 1962 96p illus. $2.25 (4-6) "The principle types of deer, elk, moose, and caribou of North America are described and contrasted, with the author's usual informed and understandable style, with some reference to the deer of South America, Europe, and Asia. Includes information on the scientific classification of deer and on their distinguishing characteristic, antlers. Accurate maps and drawings show range and appearance of many species and aid in their identification and study."

Morris, Desmond The Big Cats; illus. by Barry Driscoll. McGraw 1965 32p illus. (A McGraw-Hill Natural science picture bk) $2.95 (3-5) "A study of the 'big cats'---lions, tigers, leopards, jaguars, and snow leopards---covering where they live, what they eat, their weapons, language, and how they raise their young."

National Geographic Society Wild Animals Of North America. The Society 1960 400p illus. (Natural science lib) $7.75 Chapters by various writers grouped under the following headings: Animals in fur; The hoofed mammals; The meat eaters; Gnawing mammals; Survivors of ancient orders; Ocean dwellers. "This is an attractive, informative compilation for readers of all ages and is especially good for browsing."

Peterson, Barbara Whitefoot Mouse, by Barbara & Russell F. Peterson; illus. by Russell F. Peterson. Holiday 1959 52p illus. (Life-cycle stories) $2.75 (1-3) "This is a winter story of a woodland community at night. The central character is the most adaptable animal in it--a white-footed mouse. Its activities involve the plants and animals of the community from the treetops down into the ground. In this way the life cycle of the mouse links into the endless chain of wider cycles of life."

Phleger, Fred Whales Go By; illus. by Paul Galdone. Beginner Bks. distributed by Random House 1959 62p illus. boards $1.95 (K-2) "Every fall the big gray whales swim from the Bering Sea to the Pacific Ocean, off Mexico. This time with (an) informative whale as guide, the reader goes along--all the way to the lagoon where the baby whales are born and trained for the return journey in the spring."

Ripper, Charles L. Bats; written and illus. by Charles L. Ripper. Morrow 1954 63p illus. lib. bdg. $2.94 (4-7) "A book for young readers which tells in nontechnical language, all about bats, how and where they live, how they feed, how they give birth and care for their young, and what their enemies are. Some information is given as to kinds of bats found in various parts of the world."

-----Foxes And Wolves; written and illus. by Charles L. Ripper. Morrow 1961 64p illus. maps lib. bdg. $2.94 (3-5) "The wild dogs of North America---foxes, coyotes, and wolves--are described and contrasted with each other and with domestic dogs. What they eat and their place in the balance of nature is investigated and it is shown how they find or make shelter and rear their young. Included are maps of their range, diagrams of tracks and prints and many accurate sketches."

Ripper, Charles L. Moles And Shrews; written and illus. by Charles L. Ripper. Morrow 1957 64p illus. maps lib. bdg. $2.94 (3-6) "A fairly simple introduction to the different varieties of moles and shrews that are to be found in this country. The text describes food habits, location, anatomy and advantages and disadvantages to mankind of each animal. . . Black-and-white drawings. . . are especially useful for showing relative sizes and anatomical structure. The lack of chapter divisions, subheadings or an index will limit the book's value for younger readers or as reference material."

-----The Weasel Family; written and illus. by Charles L. Ripper. Morrow 1959 64p illus. $2.95 (3-5) "An introduction to the weasel and to other members of the weasel family: the striped skunk, the mink, the otter, the marten, the wolverine, and the badger. Habitat, diet, hunting habits, and physical characteristics are described, as is the value of the fur to hunters. The author makes clear his conviction that each of the animals fills a place in the balance of nature and should be allowed by men to maintain its population."

-----Woodchucks And Their Kin; written and illus. by Charles L. Ripper. Morrow 1963 64p illus. $2.75 (3-5) Describes the physical characteristics, habits and habitats of marmots and animals related to them; the woodchuck, prairie dogs, and ground squirrels. "Illustrations let the reader see more clearly than most photographs would how each of these interesting animals lives, has its young, and hold its place in the balance of nature."

Rounds, Glen Beaver Business. . . Prentice-Hall 1960 109p illus. $3.95 (4-6) "An almanac of the everyday activities of the beavers living and working at their trades in the nearby streams and swamps; with a few words, also, concerning their value to those who are interested in the conservation of soil and water."

-----Lone Muskrat; written and illus. by Glen Rounds. Holiday 1953 124p illus. $2.50 (3-6) A "picture of the winter activities of the small animals along the banks of rivers and ponds. The hero is an old muskrat who escaped the forest fire which destroyed his home. The plot concerns his wanderings, struggles, and adventures, until he finds and is accepted into another muskrat colony."

-----Wild Orphan; written & illus. by Glen Rounds. Holiday 1961 unp illus. $3.25 (4-6) "The story of a young beaver from the time the trapping of the parent beavers, and the other unweaned kits, made it an orphan until, months later, it left the home pond never to return. Written from personal observation the. . . narrative tells of the orphan's struggle for survival against loneliness, hunger, and enemies and describes the pond and wildlife community in which it lived. Enhanced by many small drawings."

Sanderson, Ivan Terence Living Mammals Of The World; photographs by John Markham (and others), Doubleday 1955 303p illus. $12.50 "A systematic survey which classifies and describes the known living mammals of the world and explains their structure, origin, and relationships. The . . . text is complemented by some 330 identification photographs, over half of which are in color."

Sheldon, William D. Junior Science Book Of Elephants; illus. by Matthew Kalmenoff. Garrard 1961 65p illus (Junior science bks) $1.98 (2-4) An "illustrated text describes prehistoric elephants and elephants of today, differentiates between Asian and African elephants, discusses the hunting of elephants and their use by man, and provides information on postage stamp bearing pictures of elephants."

Stoutenburg, Adrien Wild Animals Of The Far West; illus. by Ruth Robins. Parnassus Press 1958 150p illus. $3.95 (4-7) "A description of the various kinds of mammalian wild life that are found west of the Continental Divide. The first and last chapters give general information about mammals and classification, and about tracking, photographing, and taming wild animals. These are quite brief sections: the central, and main, portion of the book is divided into sections about the orders of mammals in the Far West, subdivided into families and species. The text is informal, informative and quite readable although the style is a little dry and abrupt. Physical description, habits, and habitat of each species are given and illustrations are very helpful in establishing distinguishing characteristics. Index by common names gives the Latin names also."

Van Wormer, Joe The World Of The Coyotes; text and photographs by Joe Van Wormer. Lippincott 1964 150p illus. (A Living world bk) $4.95 This book "describes the coyote's appearance, its housekeeping and hunting habits, its enemies, its way of life through the seasons of one year. It answers such questions as why do coyotes howl?. . .Do both parents participate in their youngsters' education? Do they make satisfactory pets?"

Wescott, Alita C. What Is A Rodent, by Alita C. Wescott and Carlotta M. Scott; pictures (by) Gregory Orloff. Benefic Press 1962 46p illus. (What is it ser) $1.80 (1-3) "An introduction to the most numerous order of the mammals, with distinguishing features, food, habitat, and most common species. Explains how rodents may be beneficial as well as harmful to man."

Williamson, Margaret The First Book Of Mammals; written and illus. by Margaret Williamson. Watts, F. 1957 62p illus. map $1.95 (3-6) "Forty-five mammals from all over the world briefly described, with excellent illustrations on every page. The author-artist shows in detailed black-and-white-and brown sketches how the young kangaroo is born, how a foal develops in its mother's body, how the odd platypus nurses its young, how animals use a sign language, and many other interesting facts. Excellent introduction to the mammal world."

Zim, Herbert S. The Big Cats; illus. by Gardell D. Christensen. Morrow 1955 60p illus. $2.95 (3-6) "Dr. Zim describes the cat family, its physical characteristics, and the major species--lions, tigers, leopards, cheetahs, jaguars, cougars, ocelots, lynx in his usual accurate and interesting manner. Each page is illustrated with Gardell D. Christensen's realistic but imaginative drawings that supplement the text."

-----Elephants; pictures by Joy Buba. Morrow 1946 63p illus. $2.95 (1-4) "The largest terrestrail mammals in the world are examined in their natural habitat, and in captivity. . . Examines the elephant's surprising trunk, tusks, and usefulness to man, as well as its diet, intelligence, and family activity."

-----Great Whales; illus. by James Gordon Irving. Morrow 1951 unp illus. maps $2.95 (3-6) "Many interesting aspects of the world's largest animals are explored: its ancestors, adaptations, 'sounding' and 'blowing' various species, and uses by man. Elementary text and numerous illustrations make easy reading."

-----Mammals: A Guide To Familiar American Species, by Herbert S. Zim and Donald F. Hoffmeister; illus. by James Gordon Irving; sponsored by The Wildlife Management Institute. Golden Press 1955 160p illus. maps (A Golden Nature guide) $2.99 This guide to North American mammals presents the habits and characteristics of bears, badgers, rabbits, deer, seals, whales, mice, wolves, etc. with range maps and family trees. It includes lists of books for further study, zoos and museums to visit, and a list of scientific names, as well as an index. This also describes a few extinct mammals "and ways of preserving specimens and tracks. The small size makes it ideal for taking on field trips."

-----Monkeys; illus. by Gardell D. Christensen. Morrow 1955 unp illus. map $2.95 (3-6) "The three major groups of monkeys--Old World Monkeys, New World Monkeys and Marmosets--are described. An interestingly written introduction to monkeys. Beginning with a description of the entire group of primates and showing structural similarities and differences, the author then discusses the various types of monkeys and how they resemble, or differ from, each other. The detailed drawings add interest and information to the book. There is helpful material on choosing and caring for a monkey as a pet. A useful book for nature study or hobby groups, as well as for general reading."

Films

These films are available from the Central Audio-Visual Department. Contact your building A-V Coordinator to arrange for the use of these films.

All films should be previewed to determine suitability for use with your particular class.

ADAPTATIONS OF PLANTS AND ANIMALS 13 min. Col. Int.

Examples are given of how plants and animals have adapted themselves from prehistoric times to the present. The three main adaptations are for protection, for acquiring food and for adjusting to the environment. Points out that the inability of a type of plant or animal to adjust to these factors means its extinction.

ADAPTING TO CHANGES IN NATURE 10 min. Col. Int.

The world around us is constantly changing from night to day, from wet to dry, from hot to cold. Through observation of the gray squirrel preparing for winter, a horned toad living in the dry desert, a tree reacting to the changes in season, a flower reacting to nightfall, a robin raising its young and the instinct of a monarch butterfly, we learn how animal and plant life adapts to changes in nature.

ADVENTURES OF A BABY FOX 13 min. B&W Pri., Int.

Combines photography by Arne Suckdorff with a narration written in verse to tell the story of a baby fox as it prowls through the woods. The plants and animals which the baby fox encounters are all identified.

ADVENTURES OF BUNNY RABBIT 10 min B&W Pri.

Portrays the life of a family of rabbits and relates the experiences of young Bunny, who visits a nearby farm in search of lettuce. During his wanderings he encounters a frog, squirrel, some cows, baby chickens, and other farmyard animals. Bunny finds lettuce in the green house but is caught there by the farmer. He manages to escape, and finally returns to his forest home.

ADVENTURES OF WILLIE SKUNK 11 min. B&W Pri.

An animal story for young children. The amazing story of Mother Skunk and her five babies. Featuring Willie Skunk, the baby who always seems to get into difficult situations.

AMPHIBIANS: FROGS, TOADS, AND SALAMANDERS 10½ min. Col. Int.

The films presents an overview of frogs, toads, tree frogs, and salamanders. Microscopic photography is used to illustrate stages in the metamorphosis of a tadpole into an adult frog.

ANIMAL FRIENDS 11 min. Col. Kdgn., Pri., Int.

A dog, Shep, and a small kitten play together as friends. When the dog tires, the kitten goes for a walk, meeting a gopher, a toad, a tortoise, an owl, and a tame rabbit. The eating habits of each of these animals is shown. The kitten returns home and he and Shep eat lunch together. Shep protects the kitten from a strange dog; the two then begin to play peacefully together.

ANIMAL HABITATS 10 min Col. Int.

Illustrates the specific adaptations of animals to the varying condition of life demanded by desert, deciduous forest, prairies, evergreen forests, arctic tundra and mountain timberline areas.

ANIMALS AND THEIR HOMES 11 min. B&W Pri., Int.

Illustrates and discusses the various kinds of homes that animals in the wild may build or find for use.

ANIMALS OF ALASKA 11 min. Col. Int.

The animals of Alaska, photographed by wildlife photographer Cecil E. Rhode. Typical animals are shown in their natural habitat, located in a map of Alaska. Those included are the brown bear, moose, caribou, walrus, musk oxen, mountain sheep, and other typical animals.

ANIMALS THROUGH THE WINTER 9 min. B&W Pri., Int.

Discusses and illustrates many of the adaptations which help animals survive through the winter season.

ANIMALS UNLIMITED 19 min Col. Gds. 5-6

A field trip across Africa brings to this picture painstaking photography of Africa's native animals in their native environments. While the vehicles traveled the work roads, numerous side trips into the bush and forest enabled the photographers to find the animals in their natural haunts. Much of the game is shown both pursuing and being pursued by their natural enemies.

ANIMALS WITHOUT BACKBONES 11 min Col. Int.

Nature photography points up the characteristics of the arthropods, spiny-skinned animals, mollusks, sponges, bag-like animals, and earthworms, and shows these animals carrying out some of their life functions.

ATTRACTING BIRDS IN WINTER 6 min Col. Int.

Shows how two children attract winter birds to their own backyard by building a variety of feeding stations.

BEACH AND SEA ANIMALS

10 min. Col. Int.

Examines characteristics, habits and importance of the best-known invertebrate animals dwelling on or near the beach. Reveals by underwater close-up photography, the following animals in their respective environments; star-fish. sea-urchins, crab, cuttlefish, octopus, lobster, crayfish, shrimp, snail, scallop, mussel, and sea-cucumber. Portrays interrelationships, methods of self-protection and illustrates balance in nature.

BEAR COUNTRY

33 min. Col. Int.

Depicts the North American black bear in his natural habitat. Film is by Walt Disney.

BEAVER VALLEY

32 min. Col. Int.

Pictures the life of a beaver through the cycle of the seasons, showing how he meets his daily needs, builds his home, and conducts his courtship. Filmed around a beaver pond in the west. The other animal, bird and fish life of the area is also portrayed.

BEETLES

11 min. B&W Int.

Life histories of the Tiger, Ladybird and Japanese beetles. Many rarely observed events in their lives are presented. Picture and narrative demonstrate how some beetles are beneficial, while others are harmful and must be destroyed through ceaseless warfare carried on by man.

BIOGRAPHY OF A BEE

15 min. Col. Int.

Discusses the social structure of the hive and the part played by queen, drone and worker. Follows a typical worker bee through a series of activities which includes cleaning, care of the young, wax building, ventilating, guarding, nectar processing and foraging. Explains how bees communicate by means of a dance. Compares and contrasts the bee community with human society.

BIRD COMMUNITY, THE

12 min. Col. Int.

The lives and activities of many types of the more uncommon birds are shown. They are depicted as forming a community of their own; each species has rituals and patterns of behavior unique unto itself. The biological communities are defined and illustrated. Birds in a natural community on Midway Island are pictured.

BIRDS OF THE DOORYARD

11 min. Col. Pri., Int.

Right in our own backyard, we find these birds, but it takes the telescopic lens of the color camera to discover details of their private lives. Here we see them in their favorite nesting places and learn to recognize each one. The cast of characters include the white throated sparrow, robin, bronzed crackle, house wren, yellow warbler, and the purple martin.

BIRDS OF THE SANDY BEACH   10 min.   Col.   Pri.

On the sandy ocean beaches, there are many different kinds of birds. On a single beach, gulls, plovers, sanderlings, willets, and godwits may be found. How do so many kinds of birds live here together? Because of their different characteristics it is possible for them to live together.

BIRDS THAT EAT FISH   6 min.   Col.   Pri., Int.

Shows the adaptations of the physical structure of birds that eat fish. Pictures the heron, osprey, cormorant, grebe and loon.

BIRDS THAT EAT FLESH   6 min.   Col.   Pri., Int.

Shows the adaptations of the physical structure of these birds that hunt other birds, reptiles and mammals. Pictures the hawk and owl families.

BIRDS THAT EAT INSECTS   6 min.   Col.   Pri., Int.

Emphasizes physical structure and characteristics of birds that eat insects. Includes the swallow, nighthawk, kingbird, chestnutsided warbler, yellow warbler, black-billed cuckoo, white-breasted nuthatch, hairy, downey and redheaded woodpeckers, flicker, robin, bluebird and housewren.

BIRDS THAT EAT SEEDS   6 min.   Col.   Pri., Int.

Describes adaptations of physical structure. Included evening grosbeaks, junco, indigo, bunting, goldfinch, song sparrow, crossbill and cedar waxwing.

BLIND AS A BAT   7 min.   Col.   Pri., Int.

The habits and physical characteristics of the bat. Close-ups show that is has well developed eyes. Controlled laboratory tests demonstrate the bat's ability to fly in the total darkness of caves, without hitting obstacles, by emiting inaudible cries.

BUTTERFLY MYSTERY   10 min.   Col.   Int.

A presentation of the life cycle of the anise swallowtail butterfly, showing the many small eggs on the anise leaves, the hatching of the caterpillar, and its emergence into the chrysalid form, and finally its dramatic adult appearance and its flight away to start the cycle again. Cinephotomicrography used.

CARE OF PETS   10 min.   B&W   Pri., Int.

Demonstrates by means of dramatized situations, the proper care of various common household pets. Considers the requirements of canaries, tropical fish, cats, dogs, and explains the necessity of proper food, cleanliness, grooming and training. Depicts children caring for their pets at home, and stresses the idea that proper care makes for healthy, happy pets.

COMMON ANIMALS OF THE WOODS 10 min. B&W Pri., Int.

With the woods as background, this film provides an opportunity to study various common animals in their habitats. Permits observation of such animals as the squirrel, rabbit, raccoon, porcupine, otter mink, beaver, opossum, skunk, and woodchuck. Clearly photographed individual sequences include authentic information as to appearance, size, adaptivity, habitat, habits and, in most cases care of young.

CULTIVATE YOUR GARDEN BIRDS 11 min. Col. Int.

An American neighborhood is shown observing and enjoying fifteen species of birds attracted by friendly environment.

DINOSAUR AGE 13 min. Col. Int.

Opens with a diorama of dinosaurs and then shows two paleontologists at work in the field. Fossil bones are found. Shows the making of a plaster cast, carrying in to the museum, and assembling the skeleton. An artist draws a sketch to aid in making a model. Details of the Plesiosaurus, Brontosaurus, Stegosaurus, Tyrannosaurus, and Trachodon are shown by means of models.

FARM ANIMALS 10 min. B&W Pri., Int.

Follows Farmer Brown in typical daily activities as he cares for his cows, horses, pigs, sheep and goats. Depicts him feeding his pigs, and shearing his sheep. Includes scenes of newborn calves, colts, lambs and kids. Reproduces sounds of all the animals depicted.

FARMYARD BABIES 11 min. B&W Pri.

As Daisy, the farm dog goes about her morning rounds, we see the way in which the animals of the farmyard--sheep, ducks, pigs, cows, horses, and chickens, feed and protect their babies. Film designed for reading and language expression.

A FISH FAMILY 11 min. Col. Pri., Int.

The life cycle of the Blue Acaras is presented in live photography. Explains perception, breathing, and movement of the fish. Demonstrates the preparation of the nest, laying and fertilizing eggs, care of the eggs during incubation, and preparation and use of the nursery. Notes the family relationship throughout, suggesting comparison with the human family.

FISH OUT OF WATER 11 min. Col. Int.

Close-ups show the grunion nesting in the sand and the female's desperate struggle for survival after the eggs are fertilized. Eggs removed from the sand are taken to the laboratory where the embryonic development is studied with photomicrography and the time-laspe photography Animated charts describe the grunion's remarkable timing of the tides for its spawning. In the laboratory the eggs are hatched by pouring salt water over them to demonstrate the precise relationship of the hatching process to the tide movement.

FOREST BABIES 11½ min. Col. Pri., Int.

This film shows baby animals of the forest in the following order; fawn, ducklings, bear, porcupine, mink, raccoon, oppossum, pheasant chicks, rabbits, woodchuck, coyote, and skunk.

FROG, THE 11 min. B&W Int.

Compares frogs with other amphibians and their close relatives. Shows the complete life cycle of the frog.

GRAY SQUIRREL 11 min. B&W Pri.

Tells the story of three young squirrels and their mother. Follows the young squirrels' growth and daily activities from Spring to Mid-Winter. We see Mother Squirrel feeding and taking care of her young and hunting for food. In the concluding episode, Brother Squirrel narrowly escapes from a red fox.

HIBERNATION AND OTHER FORMS OF DORMANCY
10 min. Col. Int.

Shows how that even though all animals must have food in order to survive they have many different ways of existing when their environment does not supply enough for their needs. Pictures close up some animals as they estivate, hibernate, hoard food, become fattened, or migrate to combat the food problem.

HONEY BEE, THE 11 min B&W Int.

Portrays and interprets the highly organized activities of the honey bee, and it depicts the constrasting functions of the hive's three castes of bee - the queen, the workers, and the drones.

HORSE FARM 15 min. Col. Int.

Film shows colts, yearlings, shetlands and many individual horses as they are broken to the halter and saddle. Shows the care of the horse, the saddling, bridling; riding and the principal gait.

HOUND THAT THOUGHT HE WAS A RACCOON, THE
50 min. Col. Pri., Int.

The adventure of a lost hound puppy who grew up with a raccoon family. A beautiful nature story with absorbing interplay of conflict between instinct and adaptation.

HOUSE FLY 17 min. Col. Int.

Depicts the house fly as a menace to health, through a portrayal of its habits and life history. Traces physical developments from egg-laying through larval and pupa stages to the emergence of the young fly.

HOW ANIMALS DEFEND THEMSELVES 10 min. B&W Int.

Shows the way in which animals are adapted for protection against other animals and nature. Many examples of protection or defense mechanisms are shown; speed and agility, tough shells and hides, sharp claws and beaks, camouflage and mimicry..

HOW ANIMALS EAT 10 min. B&W Int.

Explains the concept of how animals have become adapted for food-getting in order to survive. The film deals with such special food-getting adaptations as teeth, claws, beaks, poison mechanism, webs and others.

HOW ANIMALS HELP US 12 min. Col. Int.

Explains and shows the many services and products that we derive from animals. Designed to help students appreciate interdependence.

HOW ANIMALS MOVE 10 min B&W Int.

Shows the way in which animals are adapted for moving about in order to get food and to survive. It points out the various ways in which animals have become adapted (wings, fins, number of legs, etc.) to move about and solve the problem of environment.

HOW NATURE PROTECTS ANIMALS 10 min. B&W Int.

Examines the phenomena of protective adaptation of various animals to different environments. Protrays representative types in their natural habitat and illustrates different kinds of protection including ability to run rapidly, mimicry, coloration, armor and secluded homes. Among the animals shown are the tiger, giraffe, zebra, horse, kangaroo, rabbit, chameleon, magpie, woodpecker, waterhen, pheasant, looper caterpillar and beehawk, moth.

INSECTS IN A GARDEN 11 min. Col. Gds. 1-6

Through the use of photomicrography, the color camera observes insects living on a rose bush: aphids, (plant-eaters), green laceivings (aphid-eaters) ladybird beetles and ants. The intricate process of insect metamorphosis is revealed in close-up camera studies. The symbiotic relationship between ants and aphids is also dramatically portrayed.

INSECTS THAT HELP US 10½ min. Col. Int.

Four ways in which insects help us are outlined and then illustrated: bees make honey for us and other insects pollinate vegetable and fruit blossoms; other insects, like ants, work the soil which helps plants to grow; the lady-bird beetle eats insects that harm plants; the silkworm moth makes a kind of thread used to make cloth for us. Includes resume.

LIFE IN A POND 10 min. Col. Int.

Pond life is presented here showing students microscopic animals, food-chains and a wealth of plant and animal life that provide examples of important principles of natural science. Seen is a typical fresh-water pond as a home of self-sustaining group of plants and animals. Among these are green plants-shoreward, floating and submerging plants. Then the abundant animal life is seen; water flies, beetles, insect larvae, dragonfly, nymph and minnows.

LIFE IN AN AQUARIUM 10 min. B&W Int.

Shows the setting up of a classroom aquarium stocked with goldfish, snails, and tadpoles. Explains how fish breathe under water; that all animals need oxygen. Shows the difference between lungs and gills; how fish use their tails and fins for locomotion; the stages of development of the frog from the tadpole; and explains how the snails move about and protect themselves.

LIFE IN HOT, DRY LANDS 11 min. B&W Int.

In a land devoid of rain, all forms of life must struggle to survive. This film tells the story of the fierce battle of survival waged by the starving plant life, the animals, and human beings of the desert who adapt themselves to this grim existence. Your students will learn where the desert areas of the world are located . . . will learn why they are barren wasteland. Here is a pictorial lesson that will impress every student who sees it.

LIFE IN THE DESERT 11 min. Col. Int.

This exciting and beautiful film for middle grades, General Science classes, is a significant part of EBF Film library of ecology. Taking the skillfully used camera to the western deserts of the U.S. gives the viewer the opportunity to study intimately the life community that exists in such a desert environment.

LIFE IN THE OCEAN 15 min. Col. Int.

The film illustrates many plants and animals of shore, shallow water and ocean depths, relating them to each other, to their environment, and to similar forms of life found on land.

LIFE IN THE WOOD LOT 17 min. Col. Int.

The Wood Lot is an area where tree undergrowth, flowers, plants, animals, birds and insects live under the control which nature itself imposes. The emphasis in this film is placed on the "balance" which is achieved when man does not interfere.

LIFE OF A DRAGONFLY, THE

10 min. Col. Int.

Dragonflies are familiar insects found near ponds and streams. A dragonfly spends the first part of its life as a nymph, living under water. Here, it feeds on animal life, including mosquito larvae. When the nymph leaves the water, its body covering splits, and an adult dragonfly emerges. The adult is an excellent flyer, turning and darting through the aid in search of the insects it eats. Dragonflies are harmless animals, and, because they eat so many insects, they are of great value to man.

LIFE OF THE SEA STAR

11 min. Col. Int.

Illustrates the life cycle of the sea star (Starfish) and shows the adaptations of its body for life in the difficult environment of the intertidal zone. Demonstrates the characteristics which such exotic echinoderms as the brittle star, the sea urchin, and the sand dollar have in common with the starfish.

LIFE STORY OF A WATER FLEA (Daphnia)

10 min. Col. Gds. 1-6

Close-up and microscopic views of Daphnia show it carrying on basic life function, including a beating heart; the development of an egg in the brood-pouch of the mother; and peristalsis in the intestine. Children learn that Daphnia produces eggs without fertilization, has a heart and blood with hemoglobin, and that it is the major small food-organism in fresh water.

LIFE STORY OF THE HUMMINGBIRD

16 min. Col. Gds. 5 & 6

Presents a unique photographic study of the life cycle of the smallest of all birds. Shows and explains physical characteristics, feeding habits, courtship, nest building, incubation and hatching of the eggs, care and growth of the nestlings, and eventually the first flight of the young. High speed photography reveals the unusual wing movement which enables the hummingbird to remain suspended, or to fly backward as well as forward.

LIFE STORY OF THE OYSTER

11 min. Col. Gds. 5 & 6

Demonstrates how the free-swimming oyster larva develops into an adult - feeding, growing and reproducing, attached to objects in shallow waters of the ocean. Shows the place of this well known mollusk in the marine food cycle.

LIFE STORY OF THE RED-WINGED BLACKBIRD

11 min. Col. Int.

In the spring countless flocks of red-winged blackbirds migrate northward to their favorite nesting areas. With expert close-up photography, this film reveals the red-wing's typical activities and behavior during the nesting season - its courtship ritual, nestbuilding techniques, hatching and care of the young, food gathering activities, and defenses against natural enemies. This film ends with views of the spectacular mass migration of red-winged blackbirds to their winter ranges in the south.

LIFE STORY OF THE TOAD 10 min. Col. Gds. 5 & 6

Photographed in the bayou country of Louisiana, this film introduces the metamorphosis typical of amphibians. Shows the position of the toad in the food cycle and how toads reproduce, feed, and move.

LIVING THINGS IN A DROP OF WATER 10 min Col. Pri., Int.

Films uses striking photomicrography to build on an already present interest in magnifying lenses: it pictures microscopic animals and their life processes as they are carried on in plain water.

LOOKING AT FISHES 11 min. Col. Gds. 1-6

Outstanding photography gives the class a firsthand look at fishes providing plenty of opportunities to observe basic life processes-reports on reproduction, growth, nutrition, excretion, respiration and behavior, just as they actually occur. The film focuses on specific structural adaptations for performing these processes in the fish's aquatic environment.

MONARCH BUTTERFLY STORY 11 min. Col. Int.

Portrays the beauty and exquisite details of the life cycle of one of nature's most fascinating insects. Highlights minute features and unique activities of the Monarch Butterfly in its four stages of development. Close-up photography depicts the Monarch laying eggs, the caterpillar eating its way out of the egg, feeding, molting, forming its chrysalis, and emerging as a butterfly.

MOTHS 11 min. B&W Int.

Records the life cycle and characteristics of the wild silk moth and the white-marked tussock moth. Shows development of the moth from the time the eggs hatch until the adult emerges from the cocoon. The film points out that while some moths damage plants or eat holes in clothing, some supply us with silk and others aid in cross-pollinating of flowers.

MR. AND MRS. ROBIN'S FAMILY 11 min. Col. Pri.

A backyard is the setting for this story of a robin family from early spring to late fall. Mr. and Mrs. Robin raise two groups of fledglings. Beautiful nature photography reveals how the family's activities follow the seasons, their daily tasks and habits, and their recreation.

MYSTERIES OF THE DEEP 24 min. Col. Int.

The amazing evolution of life which occurs daily in the mysterious kingdom deep under the sea. In exploring the depths of the ocean many interesting creatures are to be found there. Film shows creatures of the sea, creatures around the reef, birth in the sea, and the survival in the sea.

OUR ANIMAL NEIGHBORS 10 min. Col. Pri., Int.

This film acquaints us with the appearance and habits of the rabbits, gray squirrel, chipmunk, gopher, deer mouse, meadow mouse, shrew, mole, and bat. Appealing to the younger children, it encourages them to watch for these animals near home.

ROBIN RED BREAST 11 min. Col. Pri., Int.

Reveals the interesting characteristics and habits of a robin family. Follows Father and Mother Robin as they build the nest and share the duty of incubating the eggs. Portrays the development of the young robins from the time of hatching until they are able to leave the nest and care for themselves. Dramatized sequences add to the realism of the film.

SAFETY WITH ANIMALS 13 min. Col. Int.

Safety around animals comes with knowledge and skill. Film stresses wild animals are best enjoyed by watching rather than handling. Teasing excites animals and excited animals are dangerous. Film shows you should study animals to know what you can do around them and also making friends.

SALMON: LIFE CYCLE OF SOCKEYE 10 min. Col. Int.

This film shows the complete cycle of the Sockeye Salmon beginning with its birth in a fresh water mountain stream; its trip to the Pacific Ocean where it grows to maturity, and its heroic struggle upstream to its birthplace where it spawns and dies in order that future generations of salmon may live. This is indeed one of nature's most dramatic stories.

SECRETS OF THE BEE WORLD 13 min. Col. Int.

The fierce life force at work in the highly organized and complex society of the honey makers - fertilizing agents to many of the earth's most beautiful flowering plants.

SECRETS OF THE UNDERWATER WORLD 15 min. Col. Int.

The unending variety of life to be found in a common pond, the microscopic life in a drop of water - odd forms of marine life in shallow seas and the tidal fringe.

SPOTTY, STORY OF A FAWN 10 min. B&W Pri., Int.

Primary grade teachers will welcome this story picture as a beautiful and stimulating experience for all young students. Filmed against the authentic background of the north woods, the adventures of Spotty, a wild fawn are believable and fascinating.

SPRING ON THE FARM 11 min. Col. Pri., Int.

Portrays the adaptation of plants and animals to the changing seasons, this delightful film follows Joan and Jerry as they observe the spring scene on the farm. They see buds swelling, birds returning, grass becoming green, fruit trees blooming, the planting of gardens, moths coming out of their cocoon, and young rabbits emerging from their nests.

SUMMER IS AN ADVENTURE 11 min. Col. Pri., Int.

What a wonderful season summer is! For Fred and Judy, it's a time for being out doors, for fun at the beach, catching fireflies, and picnicking. It's a time for seeing colorful flowers, plants, birds, and insects, for walking in the woods, and for enjoying long, warm and bright days.

SUMMER ON THE FARM 10 min. Col. Pri., Int.

Describes the cycle of seasons. Observing the growth of plants and animals during summer becomes a fascinating experience as we follow Joan and Jerry in their ramblings by the pond, through the orchard, and into gardens and fields. The children finally return to the house where Mother has cut the first ripe water-melon of the season.

TAD, THE FROG 11 min. Col. Pri.

As you watch Tad hatch from a tiny egg into a tadpole, and develop into a fullgrown adult, we learn how frogs breathe, what they eat, and how they grow and live. Designed to combine science concepts with a variety of language arts activities, the film also instills ideas of pet care and conservation of wildlife.

TUFFY, THE TURTLE 11 min. Col. Pri.

The snake, the frog, and other animals of the ponds teased Tuffy because his shell made him slow and clumsy. This story tells how the snail helped Tuffy realize that a hard shell could be very useful. Film provides a basis for story-telling as well as many basic science concepts.

TWO LITTLE RACCOONS 10 min. B&W Pri.

An animal story for young children. The amusing adventures of Randy and Wilburn Raccoon, two young raccoon twins, and of all the things they see and do on a day away from home.

UNCLE JIM'S DAIRY FARM 11 min. Vol. Pri., Int.

This is a natural picture story of activities of children and adults on the farm, with special emphasis on the source and use of dairy products. Many fine social concepts can be developed here through discussion of the farm as a family undertaking. Here we see the sharing of the work and of the pleasures, all helping to portray the ideals of good living.

VANISHING PRAIRIE, THE: PART I PIONEER TRAILS, INDIAN LORE AND BIRD LIFE OF THE PLAINS

14 min. Col. Int.

Shows the wagon trails made by the pioneers, explains the origins of Indian art forms and dances and describes the types of birds life on the prairie.

VANISHING PRAIRIE, THE: PART II SMALL ANIMALS OF THE PLAINS-THEIR STRUGGLE FOR SURVIVAL

15 min. Col. Int.

The story of the prairie dog, badger, cotton-tail, porcupine and other small animal inhabitants of the plains in their daily struggle against attacks from predators.

VANISHING PRAIRIE, THE: PART III LARGE ANIMALS THAT ONCE ROAMED THE PLAINS

12 min. Col. Int.

A picture story of the cougar, coyote, pronghorn antelope, bighorn sheep and other large animals that inhabited the prairie in vast numbers.

VANISHING PRAIRIE, THE: PART IV BUFFALO-MAJESTIC SYMBOL OF THE AMERICAN PLAINS

12 min. Col. Int.

Over 60 million of them roamed the plains a century ago and the Indian civilization depended on them. Describes their appearance, habitat, food and efforts to prevent extinction.

WATER BIRDS

31 min. Col. Int.

Gives glimpses into the behavior, nest building, mating and anatomical features of seaside and marshland bird life in many parts of the world.

WHITE WILDERNESS PART I ARCTIC REGION AND ITS POLAR BEARS, THE

28 min. Col. Int.

The modern day creatures of the Arctic are captured by the camera as they begin a period of hectic activity in the spring. The physical characteristics and habits of the walrus, polar bear, ringed seal and white whale are described.

WHITE WILDERNESS PART II LEMMINGS AND ARCTIC BIRD LIFE, THE

21 min. Col. Int.

The fantastic migration of the lemmings during a year of peak population is followed from its beginning to its tragic end. Such birds as the king-eider duck, turnstone, phalarope, arctic gull, loon, and the golden-eyed duck are seen as they establish their nests on the ice-freed lakes and lagoons.

WHITE WILDERNESS PART III LARGE ANIMALS OF THE ARCTIC

22 min. Col. Int.

The film shows some of the habits of the larger animals: the musk ox, caribou, wolf, reindeer, and wolverine which roam the arctic only during the summer months. The southward migration of the caribou herds at the end of the summer is included. The section on the family life of the wolf does much to erase some of the common misbeliefs about this animal.

WONDER OF GRASSHOPPERS

The common grasshopper is used to show the basic physical structure of all insects. As an example of incomplete metamorphoses, the lubber grasshopper is followed intimately through the three stages of its fascinating life.

WOODPECKER GETS READY FOR WINTER, THE

Reveals the unique manner in which the "El Carpentero" woodpecker stores acorns for winter. Close-up photography shows the woodpecker's efficient use of its head, beak and claws in providing for the months to follow. As a destroyer of harmful tree insects this carpenter of the forest is demonstrated to be a valuable friend of man.